

REPORT

INQUIRY INTO OPERATIONS OF THE UNITED STATES AIR SERVICES

REPORT

OF THE

SELECT COMMITTEE OF INQUIRY INTO OPERATIONS OF THE UNITED STATES AIR SERVICES

HOUSE OF REPRESENTATIVES

SIXTY-EIGHTH CONGRESS

ON

MATTERS RELATING TO THE OPERATIONS OF
THE UNITED STATES AIR SERVICES

UNDER AUTHORITY OF H. R. 192 AND H. R. 243
68TH CONGRESS, 1ST SESSION

MARCH 3, 1925.—By unanimous consent, *Ordered*, That the Select Committee of Inquiry into Operations of the United States Air Services be granted leave to file its report with the Clerk on or before the second Monday in December.

DECEMBER 14, 1925.—Report filed.

WASHINGTON
GOVERNMENT PRINTING OFFICE
1925

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UNITED STATES AIR SERVICES
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SELECT COMMITTEE OF INQUIRY INTO OPERATIONS OF THE UNITED
STATES AIR SERVICES

HOUSE OF REPRESENTATIVES

SIXTY-EIGHTH CONGRESS

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II

WASHINGTON
GOVERNMENT PRINTING OFFICE
1905

REPORT OF SELECT COMMITTEE OF INQUIRY INTO OPERATIONS OF THE UNITED STATES AIR SERVICES

HOUSE OF REPRESENTATIVES,
Monday, December 14, 1925.

The Select Committee of Inquiry into Operations of the United States Air Services was appointed by the Speaker under H. R. 192, passed on March 24, 1924. The scope of the inquiry was very broad, being defined in the resolution as follows:

* * * said inquiry shall include investigation of contracts, settlements, or audits thereof, letters, expenditures, reports, receipts, or other documents in any way connected with any or all transactions of the said United States Army Air Service, the United States Naval Bureau of Aeronautics, the United States air mail service, or any agency, branch, or subsidiary of either, and any corporations, firms, or individuals or agencies having any transactions with or being in any manner associated with or controlled or regulated by the said Air Services.

The committee examined more than 150 witnesses under oath and a duly appointed examiner cross-examined them, and other members of the committee participated in the inquiries. The work of the committee extended over a period of 11 months. Public hearings began on October 4, 1924, and ended March 2, 1925, being held in Washington, New York, Pasadena, and San Diego. Members of the committee or direct representatives of the committee with power to make examinations visited the following points: Bolling Field; Anacostia naval station; Bureau of Standards; Langley Field, Army Air Service; Langley Memorial Laboratories of National Advisory Committee on Aeronautics; Hampton naval air station; the Wright aircraft carrier, under construction; international races at Dayton, Ohio; McCook Field, Army Air Service Engineering School; Wilbur Wright Field, at Fairfield, Ohio, of Army Air Service; and the Curtiss Aeroplane & Motor Co. at Garden City, Long Island.

The printed record of the investigation consists of six volumes including an exhaustive index. In addition there are many exhibits on file with the committee, which are open to the inspection of Members of the House

MANUFACTURERS AIRCRAFT ASSOCIATION AND SAVE-HARMLESS CLAUSE

In the debates in Congress which led to the appointment of this committee much stress was laid upon the necessity of a complete investigation of certain general charges which had been in circulation throughout the country for some years concerning the relationship between the Government and the industry, and concerning the contracts between the Government and the industry. These charges alleged corruption of Army and Navy contract officers, that manufacturers secured excessive profits, that there existed an aircraft

trust or conspiracy among some of the Manufacturers Aircraft Association, and that the so-called "save harmless" clause in the contracts was unjust and inequitable and gave definite advantages to certain contractors.

The committee made an investigation of these charges; studying contracts in detail, examining many witnesses and calling upon the War Department, the Navy Department, the Department of Justice, and the Comptroller General to obtain the definite facts necessary. Upon the basis of these facts, the committee finds as follows:

(1) That there was no evidence of corruption on the part of the officers of the Army and Navy or the members of the aeronautical industry submitted to the committee.

(2) That contracts given to aircraft builders have not resulted in excessive profits, but, on the contrary, the aircraft industry, dependent on Government contracts, has been liquidating and going out of business to such an extent that the statement in the Lassiter Board report that "it (the aircraft industry) is rapidly diminishing under present conditions and will soon practically disappear," is justified.

(3) That the charges and the allegations that there existed an aircraft trust, or conspiracy, were not proven. Both the association and the cross-license agreement upon which it is based had been investigated nine times in eight years, two of these investigations having been made by the Department of Justice. Both have sustained the legality of the Manufacturers' Aircraft Association and the cross-license agreement. That the findings of these legal investigations should now be accepted as conclusive.

(4) That the so-called "save-harmless" clause in all air contracts, whereby the Government agrees to protect the contractor against patent claims arising out of contracts for material with the Government is directly in accord with the law, and is in fact merely an interpretation of an act of Congress passed on July 1, 1918, to enable the Government to obtain what it requires from the contractors and at the same time protect those contractors against legal risk through violation of patents, by laying upon the Government itself the burden of defending such violation or compensating for them if and when they occur in the manufacture of the essential supplies for the Government; that this principle has been the basis of Government contracting for many years, and is recognized as basically sound; that in some cases, however, it works an incidental hardship upon inventors who are financially unable to seek the redress provided for under the statutes through the Court of Claims; that the constant circulation of rumors and charges arising out of the above matters has been a destructive influence in the aviation industry in the United States for the past eight years; has deterred the influx of capital into this essential industry and has tended to drive capital out of it; has laid upon the officers of the Government and upon the owners of businesses in this trade suspicions which this committee believe unfounded.

The subject of the Manufacturers' Aircraft Association and "save-harmless" clause is more fully discussed in Appendix A.

GOVERNMENTAL EXPENDITURES IN AIRCRAFT

The committee asked and received voluminous data and much information from the Army Air Service and the Navy Bureau of

Aeronautics concerning expenditures for aircraft purposes. The committee finds:

(1) That the total expenditure for aviation for the Army and Navy Air Services for the five years, 1920 to 1924, inclusive, was \$424,234,107.90, divided as follows:

Army.....	\$246, 310, 209. 51
Navy.....	186, 861, 061. 78
National Advisory Committee on Aeronautics.....	1, 082, 126. 85

The annual expenditure of the Army and Navy was approximately \$84,000,000 per annum.

Of this \$246,000,000 charged against the Air Service of the War Department, expenditures were made as follows:

Value of war surplus stock.....	\$68, 000, 000
Housing and maintenance of personnel.....	76, 000, 000
Operation, maintenance, research, experimentation, and development of aircraft.....	78, 000, 000
New aircraft, reconditioning of war-built aircraft and for engines, of which \$2,000,000 were spent for lighter than air craft.....	24, 000, 000

Of the total amount spent in the Army Air Service, only 10 per cent went into procurement of new planes and engines and remodeling old ones.

(2) That of the Army expenditures, a total of \$102,400,887.76 were made from direct appropriations; that the principal items from these direct expenditures were as follows:

Operations, approximately.....	\$59, 000, 000
Research, invention, experimentation, remodeling, and construction of airplanes for the Army itself and purchased from outside sources.....	43, 000, 000
Purchase and remodeling of airplanes and engines for issue to units in the Army.....	22, 263, 140

That is, there has been spent about \$12,000,000 annually in operating the Air Service and about \$8,600,000 annually in procurement, research, etc.

The average annual expenditure for purchase and remodeling of airplanes and engines for issue to units in the Army has been \$4,450,000.

(3) That of the total additional cost of the Army Air Service, the principal items during the five-year period had been an item of approximately \$14,000,000 per annum, representing the value of war surplus used up year by year, an item of approximately \$9,000,000 representing the pay of the Army and an estimated item of approximately \$5,000,000 representing the expenditures of the Quartermaster Corps in regard to Army aviation.

(4) That of the sum of \$186,861,061.78 spent by the Navy in the five-year period, about \$57,000,000 were for indirect expenditures and \$46,172,893 represented the value of war surplus material. Of the balance of over \$83,000,000 about \$19,000,000 was spent for new airplanes and over \$10,000,000 for experimental, engineering research, invention, and construction. The item of \$19,000,000 includes approximately \$2,500,000 for lighter-than-air equipment (the *Shenandoah*, *Los Angeles*, etc.).

(5) That the expenditure of more than \$30,000,000 in the five-year period by Army and Navy combined, for so-called experimental and research work, has built up or maintained in both bureaus a

governmental aviation industry larger than the entire civilian industry, employing at the naval aircraft factory at Philadelphia at the time of the investigation approximately 1,100 men, and at McCook Field and Fairfield approximately 1,200 men, and entailing a naval aircraft factory pay roll of approximately \$2,200,000 a year, and at McCook Field approximately \$2,000,000 a year; that these expenditures for experimental and research work have not produced results commensurate with the expenditures and that both services, since the committee began its hearings, have greatly curtailed these expenditures and have shown a strong tendency to recognize the fact that it is unwise for the Government to spend such a large proportion of the resources in this branch.

A fuller discussion of this subject is embodied in Appendix B of this report.

(6) That in spite of the expenditure of nearly \$40,000,000 for purchase and overhaul of airplanes and motors the air services of both Army and Navy have deteriorated in equipment and in morale; that deterioration in equipment is due in large part to the increasing age of the war surplus equipment issued to the services; that the deterioration in morale is due in large part to four causes:

(a) The deterioration in equipment noted above.

(b) To the fact that war surplus equipment is far inferior in aerodynamic quality to modern equipment.

(c) The discouragement of personnel arising out of inequality of opportunity for promotion and increase of pay.

(d) The lack of an established, defined policy in the maintenance of our air forces.

(7) That, in modern equipment, quality and performance are not excelled, on the whole, in any other country in the world; but that in quantity of such equipment, there is a crying necessity for new equipment of the most modern types. Some essential types of service planes have not been developed, especially bombers, attack, and possibly pursuit planes.

(8) That the use of airplanes designed and built in the year 1918 and earlier constitutes a very large proportion of the machines used in the Army and Navy. The progress of aviation has made these machines antiquated and serviceable only for limited purposes. Their use for purposes for which they are unsuited impairs the efficiency of our aircraft service, lowers the morale of the flying personnel, and discourages the enlistment of new personnel and the training activities of the reserve officers. The committee finds that all obsolete and unsafe planes and equipment should, after proper survey, be destroyed.

ADMINISTRATION OF GOVERNMENT AIRCRAFT ACTIVITIES

The committee gave much consideration to the administration of Government aircraft activities.

In 1923 the War Department convened a board, known as the Lassiter Board, which thoroughly investigated the status of our Air Service and considered requirements for its improvement.

This board found:

After an exhaustive study of the situation the committee reports that an alarming condition in the Air Service exists, due to shortage of flying personnel and

equipment, which, if allowed to continue, will very soon cause this important combatant arm to reach a condition which will cause it to be negligible as being any national defense.

The committee believes the Lassiter Board report constitutes a fair basis for the present study of our administrative methods and that its findings as to the condition of our service are substantially true to-day.

The Army and Navy are unable to agree in proposing legislation to improve the alarming condition found by the Lassiter Board, and therefore no substantial changes in legislation or administrative practices have been instituted up to this time.

This subject is fully discussed in Appendix C.

IMPORTANCE OF AIRCRAFT

Aircraft will be the first resort of our country in case of a war emergency. It is one of the most essential arms of our military defense. Every new development of the modern airplane increases its relative importance.

It has introduced an element of mobility in military operations that compels a revision of all military plans of preaircraft days.

It has lessened the relative importance of the battleship, but has not eliminated the necessity of it. The airplane becomes the necessary auxiliary and defender of the battleship. The reluctance and hesitation with which we have recognized its growing and future importance are basic reasons for the retarded condition of our air power.

The question of the relative standing of the United States in air power among the nations of the world is largely a matter of opinion. It is clear, however, that the standing of the United States is not higher than third nor lower than fifth in the air power of the world.

The importance of aircraft is further discussed in Appendix D.

AIR SERVICE POLICIES

The committee finds:

(1) That there is no uniformity of Army and Navy policy as to organization, equipment, control of personnel, procurement design or use of aircraft; that there is no continuity of policy with respect to design and purchase of aircraft and engines in either the Army or the Navy; that the attempts to coordinate the activities of the Army and Navy by the use of joint boards, the National Advisory Committee on Aeronautics, and other agencies have been sporadic and occasional and therefore have not achieved the results desired; that there is a distinct conflict of opinion between the Army and Navy as to air activities in coast defense; that there is a wide divergence of opinion between the Army and Navy as to the effectiveness of aircraft operating against surface vessels; that there is an equally wide divergence of opinion as to the value of antiaircraft artillery operating against aircraft; that there is a certain amount of unnecessary duplication in the expenditure of both money and effort by the Army and Navy seeking to accomplish similar results in technical research, in construction, and in administration of aircraft; in procurement, in hospitalization, and in training and field activities.

(2) That the Navy system of promotion and pay deprives flying personnel of opportunity for high command and does not recognize that the aviation service is any more hazardous than the nonflying

branches of the service; that this result is lowering the morale of the aviators in the Navy and is a hardship which can be and should be remedied.

(3) That discrimination arises in respect to the pay and promotion of Army aviators, which has been one of the contributing factors to a spirit of discontent, which appears from testimony to be general throughout the Army Air Service.

(4) That the air defense of the country has created new and very involved problems of administration. The difficulty of solving these administration problems has been materially increased by reason of the fact that neither in the General Staff of the Army nor on the General Board of the Navy has there been sufficient representation of officers experienced in aviation matters and who have advocated the full and complete use and development of Army and Navy aviation for the defense of the country.

(5) That a great many remedies have been advocated in this and in other lands to cure the conditions arising out of the great problem of administering the new art of air warfare, the principal of which are as follows:

(a) A unified air force operating independent of the Army and Navy and sending units to these services as needed.

(b) A separate air force operating individually, the Army and the Navy at the same time retaining all the units required for Army and Navy tactics.

(c) Aviation corps in both Army and Navy.

(d) A slight modification of the present system by the installation of assistant secretaries of air in the War, Navy, and Commerce Departments.

(e) A department of national defense under one civilian secretary.

(f) The building up of a great air power through the curtailment of many branches of Army and Navy.

THE AVIATION INDUSTRY

The committee found unanimity of opinion from all sources—military, naval, commercial and industrial—that the aviation industry is an essential part of national defense and must be maintained. The committee finds as follows:

(1) That the aviation industry in the United States has dwindled and is dwindling; and that the principal causes of the weakness of the industry are as follows:

(a) Lack of continuity in Government orders.

(b) Losses on Government contracts, both experimental and production.

(c) Direct competition by Government plants.

(d) Failure to recognize and protect design rights.

(e) A destructive system of competitive bidding.

(f) Discouragement of enterprise and individual efforts as the result of more than 20 investigations of various sorts in a period of 8 years.

(g) Lack of confidence and mutual understanding among contractors themselves.

(h) Failure of the industry to develop commercial and export trade.

The power of the airplane industry to serve the country in case of emergency has greatly decreased since the peak of its productivity during the war period.

The subject is more fully discussed in Appendix E.

COMMERCIAL AVIATION

The committee finds:

(1) That in respect to the operation of airplanes for profit, the United States is far behind in the use of planes for aviation.

(2) That other nations excel us largely because of subsidies granted commercial aviation as a reserve for war.

(3) That commercial aviation lags because of the inherent difficulty of operating on a profit-making basis. That its development is further handicapped by the lack of congressional legislation for its regulation and encouragement, for the licensing of pilots, the inspection of airplanes, and the general regulation of interstate flying.

(4) There is a lack of airways, aircraft facilities, meteorological service, air terminals, and lines.

(5) That the United States has failed to ratify the International Air Convention.

(6) The committee finds that there are about 10,000 surplus Liberty motors. These motors placed on sale at moderate prices might encourage commercial aviation.

(7) We find instances in which the departments calling for competitive bids for new designs of airplanes have allowed insufficient time in which bidders could properly prepare and submit plans and designs. This matter is further discussed in Appendix F.

ACQUIRING TITLE TO PATENTS

There are many instances in which it is necessary or desirable that the Government acquire the use or ownership of patents for aircraft or other requirements. The Government is frequently charged with the infringement of patent rights by owners. The Government may acquire a patent or the right to use it by purchase or by appropriation. In practice, the methods of acquiring patents, both by purchase and appropriation, do not appear satisfactory either from the standpoint of the Government or the patentees. If the Government infringes or appropriates a patent, the only recourse of its owner is to prosecute a suit in the Court of Claims. The expense and delay of such a proceeding frequently amounts to a substantial denial of the rights of the patentee. This situation calls for remedial legislation.

DEPARTMENT OF NATIONAL DEFENSE

Our military organizations are manifestly designed for one purpose—the national defense. The Army and Navy are each vast organizations, with a multiplicity of functions. They perform many duplicated and similar functions. Each is designed for action in case of war. They are less burdensome to maintain and more efficient when their expenditures, their training, their preparation, and the performances of their duties are coordinated, harmonized, and centralized.

A single department of national defense through its unity of command would harmonize our national defense system, reduce expenditures for supplies, and prevent needless duplications, promote understanding, lessen friction between our different military arms, and provide a uniform and equalized system of pay, promotion, and retirement. It should decrease the overhead of maintenance and decrease the number of organizations and bureaus within the departments. It should promote the interchange of effort in peace and war; it should work for economy, efficiency, and strength in our national defense.

It would train and habituate our military organizations in peace time, for that cooperation that is essential in war.

RECOMMENDATIONS

The committee recommends:

1. That the Federal Government cease competing with the civilian aircraft industry in the construction of aircraft, engines, and accessories.

2. That means be provided whereby the inventor who alleges violation of his patents by the Government may apply for relief other than by resort to the Court of Claims.

3. That procurement be separated from operation in all Government air services.

4. That one single governmental civil agency be given sole charge of procurement of aircraft, engines, and equipment, to the end that duplication in expense be avoided, uniformity of equipment promoted, and a continuous and definite policy established looking to the strengthening of the sources of supply, the maintenance of the industry, the promotion of the aircraft production capacity of the Nation, and the establishment of a sound policy of Government procurement.

5. Congress should at once pass a law permitting the procurement of aircraft engines and aeronautical instruments and accessories without requiring competitive bidding under restrictions that will promote the best interests of the Government.

6. That Congress authorize the procurement agency to recognize rights in designs of aircraft, engines, and accessories.

7. That the industry be assisted in the procurement of noncommercial supplies, either through the Government as debits on procurement contracts, or the grouping of purchases within the industry.

8. That the Air Service departments of the Government make greater use of the facilities of the Bureau of Standards for research and technical work and correspondingly reduce their own activities.

9. That Congress provide by law for the regulation and encouragement of commercial flying through a bureau of air navigation in the Department of Commerce. Provision should be made for the charting of airways, for emergency fields, aircraft facilities, night flying, and a specialized weather information service. That so far as practical such developments should be preceded by essential engineering surveys.

10. That Army and Navy landing fields and facilities be made available for civilian aviation, so far as practicable.

11. That Governors Island, at New York City, and Grant Park, at Chicago, be made airports for postal and civilian use.

12. That a greater number of men be trained as aviators and that more adequate equipment and facilities be provided for our reserve flyers.

13. That reserve pilots be given not less than four hours' training per month throughout the year and be called for active duty at Air Service stations for tactical training for a period of not less than two weeks each year.

14. That additional compensation necessary to secure an adequate number of competent mechanics to maintain airplanes in efficient operation be provided; that such mechanics should be relieved of routine military duties.

15. That Congress provide remedies for the inequalities and injustices suffered by the aviation officers of the Army and Navy.

16. That Congress determine immediately and settle by legislation the respective fields of operation of the Army and the Navy.

17. That the War and Navy Departments should survey, condemn, and destroy all obsolete and unsafe airplanes.

18. That the War Department release for general commercial use at least two-thirds of the war-built Liberty engines now held in storage at moderate prices.

19. That not less than \$10,000,000 should be spent annually for the War Department and like sum for the Navy Department for the procurement of new flying equipment, constructed by the civilian industry. The orders should be based on a continuing program.

20. That there be established a separate and all-inclusive budget for each of the air services, the allocation of the appropriations to be by law.

21. That a five-year program of construction, education, training, appropriation, and commercial encouragement should be formulated and carried out.

22. That the Air Services of both the Army and the Navy should at once be adequately represented on the General Staff of the Army and the General Board of the Navy by members who will firmly support the full and complete use of Army and Navy aviation for the defense of the country.

23. That there be established a single department of national defense, headed by a civilian secretary, specially charged with the coordination of the defenses of the country.

FLORIAN LAMPERT, *Chairman.*

ALBERT H. VESTAL.

RANDOLPH PERKINS.

CHARLES L. FAUST.

FRANK R. REID.

CLARENCE F. LEA.

ANNING S. PRALL.

PATRICK B. O'SULLIVAN.

WILLIAM N. ROGERS.

APPENDIX A

MANUFACTURERS' AIRCRAFT ASSOCIATION AND SAVE-HARMLESS CLAUSE

The committee naturally "began its inquiry by taking up definite charges made in speeches delivered on the floor of the House against the methods of administering the Air Service and against the aircraft industry."

Briefly, and generally stated, these charges are:

1. Charges are openly made that the Air Service procedure is corrupt and that our defense in the air is in peril because of these conditions. Contracts given to members of the Air Trust carry excessive profits "so that one-fifth of the money appropriated by this Congress to the Air Service goes in profit, under the contract, to the aircraft builders."

The most searching investigation on the part of the committee discloses not the slightest ground for the charge that the Air Service procedure is corrupt.

The concrete part of this allegation of corruption between the air services and the industry is found in the statement that "one-fifth of the money appropriated by this Congress to the Air Service goes in profit, under the contract, to the aircraft builders."

A mere perusal of the cost figures will show that the total amount paid by the Army and Navy to this industry for planes and engines during the past four years is far less than 20 per cent of the appropriations.

Instead of prospering on Air Service contracts, the industry is impoverished. A large percentage has failed and gone into the hands of receivers. In one instance the receiver got a Government contract and went into bankruptcy on it. Of those which have escaped receivership, a number have gone into voluntary liquidation. The remainder are, as expressed by Secretary of War Weeks, "hanging on by their eyelids." Secretary Weeks says (p. 717), "I do not think that aircraft industry as an industry is making any money." General Patrick, on page 176, speaking of the industry, says, "I do not see how it could get much lower." Admiral Moffett says (p. 358), "I think the industry is in a very unsatisfactory condition from the viewpoint of the industry as well as the viewpoint of national defense. The lack of prosperity in the industry is due not only to lack of Government orders but a lack of continuing policy."

In fact, there is general agreement from all of the witnesses, whether from the Government, the industry or outside, that the aircraft industry, instead of fattening on Government contracts, is being steadily starved to death.

2. The next charge made against the Air Services, which is offered to account for its present condition of inefficiency, is:

That aircraft companies were hastily organized to take advantage of the war—that they formed themselves into an Air Trust, known as the Manufacturer's Aircraft Association (Inc.). This trust got up the "cross-license agreement" and by means of it did and still continues to perpetrate a fraud upon the Government.

The committee finds that there is no "aircraft trust"; that there is not now and never has been a service conspiracy.

The Manufacturer's Aircraft Association (Inc.) was formed and the cross-license agreement entered into under the following circumstances:

The principal patents in the airplane industry were controlled by the Wright-Martin Aircraft Corporation and the Curtiss Aeroplane & Motor Corporation. The former, controlling what is claimed to be a basic patent, was demanding high royalties from all other aircraft manufacturers. The latter, controlling numerous important patents, was likewise making demands for royalties upon the other aircraft manufacturers. The patents controlled by these companies were of such a character as to make it difficult for any aircraft manufacturer to construct any modern approved form of airplane without infringing one or more alleged patents of each of these companies. The result of these patent claims was not only to render the cost of airplanes to the Government excessive, but also to make it difficult for the Government to get its orders filled, because some of the airplane manufacturers, in view of impending patent litigations, were unwilling to make further expenditures upon their plants.

Confronted with this serious crisis, the War Department and the Navy Department requested the advisory committee to investigate the situation and to suggest a solution for the unsatisfactory conditions existing in the airplane industry. Acting in accordance with these requests, the advisory committee proceeded to make a careful study of the situation, and after several months of investigations and numerous conferences with all interests directly involved, recom-

mended the formation of an association of aircraft manufacturers, with a form of cross-license agreement.

Pursuant to the recommendation of that committee, the Association (Inc.), was formed and the cross-license agreement now under consideration was entered into.

Just what is the cross-license agreement?

Robert H. Young, special assistant to the Attorney General, having charge of the preparation of the defense of aircraft patent claims brought against the Government, described the cross-license agreement, as follows:

"The cross-license agreement brings together into a unitary control in the neighborhood of 200 patents, including the basic Wright patent and the basic Curtiss patent, whereby the Government is able to deal directly with all of those and others grouped together, whereby the actions for infringement on each and all of these patents are avoided, and in the best of my judgment a reasonable businesslike arrangement with the owners of those properties effected. It avoids the necessity of defending suits and permits the Government to build ships, flying machines, and be in a position to deal advantageously with the very large group of important patents relating to that art" (p. 224).

See opinion of Attorney General Gregory rendered to the Secretary of War October 6, 1917.

The subject of the legality and effect of the "cross-license agreement" and the Manufacturers' Aircraft Association has been gone into so thoroughly in opinions of Attorney General Gregory, Attorney General Sargent, Lieutenant Colonel McMullen, Col. Robert H. Young, and others that in order to do that subject complete justice in a report the committee would be obliged to incorporate that testimony in extenso.

After a most thorough going examination into this subject, we find that there is no such thing in this country as an aircraft trust, nor are the manufacturers, by means of the "cross-license agreement," perpetrating a fraud upon the Government.

On June 20, 1924, W. A. Bethel, Judge Advocate General, prepared a memorandum for the Assistant Secretary of War on the subject of "Violation of laws by Manufacturers' Aircraft Association and their cross-license agreement and save-harmless clauses in Government contracts." This opinion is printed at length in the hearings and found on pages 179 to 209, and covers the subject quite completely, and reviews in detail the criticisms made in speeches in the House.

In an opinion rendered by Attorney General Gregory at the request of Secretary of War Newton D. Baker on October 6, 1917, the Attorney General said:

"Not to go into further detail, it suffices to say that upon the data submitted to me, I am of the opinion that the Association (Inc.) as now constituted and the cross-license agreement under which it is operated, are not in contravention of the antitrust laws of the United States" (p. 1719).

A second opinion of Attorney General Gregory on this subject was included in a letter dated October 31, 1918, transmitting to President Wilson the report of the Hon. Charles E. Hughes, as follows:

"Whatever may be said of the charge that this arrangement tends to discourage future inventions, one of its results was to enable the Government, through contractors, to secure the use of all necessary patents at a fixed cost and with little friction. It was not entered into until the Attorney General had given an opinion that it did not conflict with the antitrust laws. I find no basis for the suggestion that in bringing it about the members of the Aircraft Board were actuated by an unlawful or dishonest motive."

Attorney General Sargent on March 24, 1925, in reply to an inquiry of this subject from the Secretary of the Navy, gave an opinion in which he said:

"The Secretary of War distinctly recognized the patents grouped in the Manufacturers' Aircraft Association and expressed the desire to proceed with the use of such patents. Indeed, several agencies of the Government appear to have collaborated and cooperated in creating the conditions established by the cross-license agreement and the supplement thereto. It is obvious that the Government was fully informed of the patents and that there was no purpose deliberately to take the property of another without the intention that he should be compensated, and there was assent by the patent holders that the patents be used and a definitely established rate be paid for the use that ensued.

"You may, with entire propriety, enter into a contract with those 'associates' for the payment of royalties upon all airplanes to be manufactured or used by the Government in the future, which airplanes make use of the inventions of any of the patents here under consideration remaining in force."

See also Comptroller's Opinion, pages 3156-3163.

A searching investigation was made by the committee as to the existence of an "air trust" and the effect of the cross-license agreement. The evidence is too voluminous for quotation in this report.

The cross-license agreement was a pooling of about two hundred patents, some of which were basic, permitting each member to use all of the patents pooled in payment of a royalty to the association of \$200 per plane. It was a practical business arrangement to do away with litigation over patents and permit the members to build planes rather than try lawsuits against each other. Any builder could become a member upon payment of a membership fee of \$1,000 and by putting in his patents get the right to use all other patents in the control of the membership. A similar cross-license agreement has long been in use in the automobile and other industries. The feature of a trust is to keep others out. All could enter here upon payment of a membership fee costing about one-seventeenth of the average cost of a plane.

3. The next distinct charge against the Air Service was that the "save-harmless" clause in the Government contract was in fact simply an authority granted by the officials of the United States to certain private aircraft manufacturers to steal deliberately the patents of any inventor whose patent appliances the Air Trust might desire to use.

This much discussed "save-harmless" clause is described by General Patrick (p. 1421):

"Major General PATRICK. In 1910 the Congress passed an act which it was thought would place upon the Government the burden of any claim that might be raised by an inventor for the infringement of his patent, in the construction of any article for the United States. A great many contracts were let with that understanding. While the war was in progress, and if I recollect correctly, in March, 1918, there was a decision of the Supreme Court which absolutely upset, if I may put it so, that interpretation of this particular law, so that the contractor had no protection and was himself subject to suits for infringement. The attention of the War Department and the Navy Department was drawn to this legal tangle, particularly during the construction of certain wireless apparatus, and the contractor who had agreed to furnish it at a certain price, after this decision of the Supreme Court found himself confronted with the probability that he would be sued for large sums of money for infringing certain patents belonging to others. I am told there was a state of almost panic in the War Department when that came to the attention of the authorities there. So vital was the matter that the Secretary of War simply took upon himself to write to some of these contractors to go ahead and that he would see that they were protected. Those letters are on file. I have read them, and they can be produced, of course.

"The War Department and the Navy Department then combined and sought relief from Congress. An amendment to, I think the Navy bill, was then passed on the 1st of July, 1918, which in layman language places upon the United States the burden of any claim on the part of an inventor for the infringement of his patent used in the construction of any article for the United States. This save-harmless clause which we have placed in our contracts merely puts in simple language this law of Congress and says to the contractor, 'Go ahead and build this article, whatever it may be; if you infringe anyone's patent, the United States will hold you harmless.' This clause is clearly and distinctly in accord with this particular law of Congress, which places that burden upon the United States. We could have given the contractor the protection in several ways: We could have recited the law in the contract, or could have referred to it, but, thinking that many contractors like myself are not learned in the law, we put it in simpler language. So that is the object and briefly the intent of this particular save-harmless clause."

Lieutenant Colonel McMullen, chief of the central patent section of the War Department, testified (p. 208) in answer to the question:

"What is the legal effect at the present time of the present save-harmless clause?"

"Lieutenant Colonel McMULLEN. The legal effect is that where a man has legal property which is entitled to protection, like a patent, he saves the Government harmless. So that we are saved harmless as to suits or anything arising in the future, and where we require the use of something which he does not own we save him harmless. That is the legal effect of the save-harmless clause."

Both the cross-license agreement and save-harmless clause are discussed in the evidence of Col. Robert H. Young, special assistant to the Attorney General (pp. 222 et seq.). At page 265 Colonel Young says:

"Mr. YOUNG. The save-harmless clause is something which was brought into the Government method of contracting in 1918; after the decision of the Supreme Court in the cases of *Marconi v. Simon and Cramp v. Curtiss*, and there is no relation to the cross-license agreement as such. It obtains and applies to any Government contracts within the Air Service for engines or instruments of any kind. It has no bearing upon the airplane patents.

"Mr. LEA. Do you know who introduced into the Army contract the save-harmless clause?

"Mr. YOUNG. Secretary Baker, under these circumstances. A great many contracts had been let in 1917 which were either silent on the question of patent liability or contained a clause in which the contractor himself assumed a responsibility. That situation was continued under the interpretation or general acceptance of the acts of June 25, 1910, which under any circumstances held the Government responsible and the contractor immune involving patent infringement in the performance of contracts with the Government.

"When the Supreme Court in those decisions reversed that accepted view and then suggested that equitable relief might be had by the owners of patents against contractors, with the Government, a good many contractors, notably, for instance, the De Forest Co., found themselves in violation of injunctions that had been issued by the court in their private contracting and building. So Mr. De Forest and others came down to the Government and said: 'We can not proceed because we are liable to suit; we are liable to injunctions, and the more contracts we get the worse off we are.'

"Secretary Baker and also Secretary Daniels of the Navy recognized the necessity of an emergency and issued orders reversing the liability and assumed the liability on behalf of the Government, and the officers responsible in making contracts then proceeded under that authority and instructions thereafter incorporated in the contracts that were made provisions whereby the contractor assumed the responsibility for such patent rights as he might hold or be in privity with, and the Government assumed that liability for such other patent rights not possessed by the contractors."

After the criticisms on the floor of the House leveled at the cross-license agreement and save-harmless clauses in contracts, W. A. Bethel, Judge Advocate General, rendered an illuminative opinion found on page 209 of the record. That opinion concludes as follows:

"9. The general policy of the War Department in regard to the so-called 'save-harmless' clauses is defined in General Order No. 40, supra. The United States requires the contractor to assume the ultimate liability incurred under all patents which he controls. Where the contract and specifications involve the use of patented devices, the patents not being controlled by the contractor, the United States assumes responsibility for their infringement and in these 'save-harmless' clauses gives the contractor information to that effect."

See also memorandum of the Judge Advocate General, dated April 11, 1918, found on page 2479.

Lieutenant Colonel McMullen (p. 215) said:

"Those save-harmless clauses have been used for Government contracts for, I should say, time immemorial. Before the war, or before 15 years ago, contracting officers used to largely write their own contracts, and they negotiated a contract as between the Government and a contractor just like private parties would negotiate a contract. They would agree on the clauses. There were certain statutory clauses that had to go in all contracts; but as to other clauses, they were negotiated like any private contracts, and many of them contained save-harmless clauses.

"We have had more patent suits growing out of Government use of inventions during and since the war than we have had during the whole history of the country. I might say that Mr. Young has just brought to my attention here a case which I had forgotten. The first and only case that I know of in which the save-harmless clause was adjudicated was the case known as the Winchester Arms case. That was tried many years ago. I do not remember just when, but in that case the Court of Claims said that the Winchester Arms Co. was, in fact, saved harmless and that the Government had to pay, and they did recover not only the judgment but the attorney's fees, amounting to, as I remember, about \$14,000. I mean that the Government paid it all. The court held, and it was upheld, too, that the contract was legal as to save-harmless clauses, and that 'save-harmless' meant just what it said—that the contractor was saved harmless."

The save-harmless clause as now used is the result of legislation by the Congress.

Prior to the act of June 25, 1910 (36 Stat. 851), no liability for patent infringement, to use that term strictly, existed on the part of the Government, for the reason that such an infringement is a tort, and the Congress had never consented to permit the Government to be sued on tort. That act provided: "Whenever an invention described in and covered by a patent of the United States shall hereafter be used or manufactured by or for the United States without license of the owner thereof or lawful right to use the same, such owner may recover reasonable compensation for such use by suit in the Court of Claims," with certain provisions which are not material to this discussion.

The United States Supreme Court in the case of *Crozier v. Krupp* (224 U. S. 203) clearly states the situation as it existed prior to the above act and the object which the Congress desired to accomplish by the enactment of that act in the following words:

"The text of this statute leaves no room to doubt that it was adopted in contemplation of the contingency of the assertion by a patentee that rights secured to him by a patent had been invaded for the benefit of the United States by one of its officers, that is that such officer under the conditions stated had infringed a patent.

"The enactment of the statute, we think, grew out of the operation of the prior statute law concerning the right to sue the United States for the act of an officer in infringing a patent as interpreted by repeated decisions of this court. *United States v. Palmer* (128 U. S. 62); *Schillinger v. United States* (155 U. S. 16); *United States v. Berdon Fire Arms Mfg. Co.* (156 U. S. 552); *Russell v. United States* (182 U. S. 516); *Harley v. United States* (198 U. S. 229). The effect of the statute was thus pointed out in the last cited case (198 U. S. P. 234).

"We held in *Russell v. United States* (182 U. S. 516, 530) that in order to give the Court of Claims jurisdiction under the act of March 3, 1887 (24 Stat. 505, c. 359), defining claims of which the Court of Claims had jurisdiction, the demand sued on must be founded on a convention between the parties—a 'coming together of minds.' And we excluded, as not meeting this condition, those contracts or obligations that the law is said to imply from a tort. *Schillinger v. United States* (155 U. S. 163); *United States v. Berdan Firearms Manufacturing Co.* (156 U. S. 552).

"In other words, the situation prior to the passage of the act of 1910 was this: Where it was asserted that an officer of the Government had infringed a patent right belonging to another—in other words, had taken his property for the benefit of the Government—the power to sue the United States for redress did not obtain unless from the proof it was established that a contract to pay could be implied—that is to say, that no right of action existed against the United States for a mere act of wrongdoing by its officers. Evidently inspired by the injustice of this rule as applied to rights of the character of those embraced by patents, because of the frequent possibility of their infringement by the acts of officers under circumstances which would not justify the implication of a contract, the intention of the statute to create a remedy for this condition is illustrated by the declaration in the title that the statute was enacted to provide additional protection for owners of patents. To secure this end, in comprehensive terms the statute provides that whenever an invention described in and covered by a patent of the United States 'shall hereafter be used by the United States without license of the owner thereof or lawful right to use the same, such owner may recover reasonable compensation for such use by suit in the Court of Claims.' That is to say, it adds to the right to sue the United States in the Court of Claims already conferred when contract relations exist the right to sue even although no element of contract is present. And to render the power thus conferred efficacious the statute endows any owner of a patent with the right to establish contradictorily with the United States the truth of his belief that his rights have been in whole or in part appropriated by an officer of the United States, and if he does so establish such appropriation that the United States shall be considered as having ratified the act of the officer and be treated as responsible pecuniarily for the consequences."

We find nothing to justify the charge that the "save-harmless" clause is wrong in principle or is authority granted to the officials of the United States to aircraft manufacturers to steal patents of inventors.

As stated by General Patrick (p. 142), "merely puts in simple language the law of Congress."

We do not find that the unsatisfactory condition in the Air Service is due to the cross-license or the "save-harmless" clause in Government contracts.

APPENDIX B

GOVERNMENTAL EXPENDITURES IN AIRCRAFT

In the fiscal years 1920-1924 the cost of the Army and Navy Air Services has been the vast sum of \$424,234,107.90.

Of this \$246,000,000 was charged against the Air Service of the War Department, of which \$68,000,000 represented estimated cost of issues from war surplus stock; \$76,000,000 for pay, housing, and maintenance of Air Service personnel; \$78,000,000 for operation, maintenance, research, experimentation and development of aircraft; \$24,000,000 for new aircraft and reconditioning war-built aircraft and for engines, of which \$2,000,000 were spent for lighter-than-air craft. (Weeks, 3017.)

Of the total amount spent in the Army Air Service only 10 per cent went into procurement of new planes and engines and remodeled old ones. (Walsh, p. 1568.)

The expenditures from direct appropriations made to the Army Air Service during this five-year period was \$102,400,887.76; of this approximately \$59,000,000 was spent in operations during these five years and approximately \$43,000,000 in research, invention, experimentation, remodeling, and construction of airplanes by the Army itself and purchased from outside sources. That is, there has been spent about \$12,000,000 annually in operating the Air Service and about \$8,600,000 annually in procurement, research, etc.

For the purchase or remodeling of airplanes and engines for issue to units the Army in these five years has spent \$22,263,140, or an average of about \$4,450,000 each year.

It is thus evident that the Army Air Service has been spending on an average of \$4,200,000 per year in experimentation, inspection, its own construction, its own effort to invent and develop, and only \$4,400,000 per year in new equipment, notwithstanding, as the Lassiter Board report said, "after an exhaustive study of the situation the committee reports that an alarming condition in the Air Service exists, due to shortage of flying personnel and equipment, which if allowed to continue will very soon cause this combatant arm to reach a condition which will cause it to be negligible as being any national defense."

The figures presented by the Navy indicate that in the five fiscal years 1920-1924 there has been spent a total of \$186,861,061.78. It appears that of this, \$57,000,000 was for indirect expenditures and \$46,172,893 the value of war surplus material, leaving \$83,688,158; of this latter amount about \$19,000,000 was spent for new airplanes and only \$10,000,000 was spent in experimental engineering, research, invention, and construction.

Too much has been spent attempting to put the Army and Navy in the business of manufacturing airplanes, experimentation, research, etc., and too little has been spent in actual purchase of airplanes and engines.

Both Army and Navy instead of sticking to their job—preparing themselves to fight—have been operating large factories with thousands of employees and specialists on the pay roll. The pay roll at the Philadelphia aircraft factory is \$187,000 per month—(Lane 1347) that means \$2,204,000 a year.

"The amount allotted for salaries and wages for experimental and research work at McCook Field for the fiscal year 1925 was \$1,700,000. There has been since allotted \$230,898 to provide funds for increase due to classification." (Patrick, p. 545.)

A total for salaries alone for experiment and research of \$1,930,898, or nearly \$2,000,000, for the year 1925—while the Army only spends \$4,000,000 annually in new airplanes and engines.

Twenty million dollars passed through the engineering division of the Army Air Service in five years (Patrick, p. 545), almost equal to the entire amount spent for planes and engines by the Army.

At McCook Field there are between 800 and 900 employees and 400 at Fairfield, the vast majority of whom are mechanics.

The naval aircraft factory at Philadelphia employs from 1,100 to 1,300 (Land, p. 1341), and there are also 484 employed at Pensacola.

In other words, the Army and Navy Air Services are running the two largest aircraft factories in the United States and employ more civilians than the entire aircraft industry. (Lawrence, p. 1002.) Both services are violating the principle that "It is fundamental that the Government should not engage in any business which private enterprise can do as well or better" (p. 1002).

The Air Services (Army and Navy) have no standard procurement policy. They have not sufficiently recognized the principle of "proprietary rights."

They have not spent their money with a view to continuity of production in the industry. They have constantly competed with the industry. They have spent a large part of their appropriation in attempting to do things that ought to be left to private capital, and which can better be done by private capital, all with the result that the aircraft industry is languishing.

The industrial decline in aircraft is due to lack of orders. (Young, p. 238.)

There are many manufacturers of aircraft who are literally hanging on by their eyelids, hoping something will develop to enable them to get a new dollar for an old one. (Secretary Weeks, p. 617.)

The lack of prosperity in the industry is due not only to lack of Government orders but a lack of continuing policy. (Moffett, p. 358.)

Until there does come a commercial demand, aircraft manufacturers are depending solely upon the Government for their orders. Without a continuity of work in their factories they can not conduct their building of aircraft economically. (Patrick, p. 527.)

It (the aircraft industry) has been absolutely declining over a period of some years. (Patrick, p. 176.)

"Because of the lack of a definite, intelligent, and sympathetic policy in our governmental aircraft organization since the armistice, our American aeronautical industry, built up at such great expense of money and effort, is rapidly disappearing. No sensible business man is justified in keeping money invested in the aircraft industry under the conditions which have maintained in the United States since November 11." (Coffin, p. 1219.)

"Secretary DAVIS. There are a great many companies building aircraft, and I do not believe any of them are making any money, and I think the most of them are just hanging on in the hope that the situation may get brighter. If there is no prospect in the future, a great many more of them will go out of business.

"Mr. PERKINS. To what do you attribute that situation?

"Secretary DAVIS. Very largely to the fact that practically the only customers, the only people buying airplanes, are the Army and the Navy services. There is very little commercial aviation, and the Army and Navy have not spent enough money in the past on procurement of planes to keep the various companies alive. I think that is one of the most serious features of the whole aviation situation" (p. 653).

"The state of the aircraft industry in the United States to-day is particularly to be deplored. Due to lack of any appreciable use of aircraft for commercial purposes, our factories are mainly dependent for their support upon the appropriations provided annually by Congress for Federal aviation purposes." (Drum, p. 1237.)

"Mr. PERKINS. What percentage of the airplane business in the United States has been done by private capital and what by the Government?

"Mr. KEYS. If you take design, engineering, production, and major repairs as being proper industrial functions in the aircraft industry, I do not believe 10 per cent of it has been done by the industry in the last five years.

"No other country in the world that desires to be an air power does anything like the percentage of its own business in its own shops that is done by the United States Government." (Keys, p. 1155.)

In our opinion the thing that is essentially wrong with the Air Services is not merely one of policy of spending the amount of money allotted to aviation. It goes back of that. Air power is a comparatively new thing in war. Before it can take its proper place, it must demonstrate its possibilities to officers who have been educated and grown up in a different system of warfare.

Experience is naturally and properly conservative in its tendencies, and chary to admit the claims of new instruments of war. But the reluctance of the older training to recognize the usefulness of newer methods can go too far.

Senator Bingham in his testimony before the committee (p. 2749) has instanced this. He said, speaking of his war-time experience:

"I discovered also that the General Staff here in Washington at that time, by act of Congress, was considerably reduced, as you may remember, had made no plans, no constructive plans, for an air service. I was astonished to find that they did not know how many planes we were to use, or how many pilots we were to train, or what fields we were to train them at, or what system we were to follow. Coming on duty here about the 1st of May, 1917, it seemed to me the General Staff had entirely neglected the possibilities of aviation."

And then proceeds to relate his embarrassment when invited to look into a plane:

"Although an aviation officer, I was obliged to wear spurs. After awhile they reversed that order, and aviation officers were not required to wear spurs, but after I came back from abroad I found that they had gone on the old order again, and aviation officers wearing boots were once more required to wear spurs."

Along this same line see the testimony of Coffin (pp. 1207, 1215, and 1237), LaGuardia (p. 2377), Mitchell (p. 1892), and Senator Bingham (p. 2753):

"Now, in our General Staff, while they have been able to use centuries of wisdom gained from the experience of soldiers on foot, they have no experience to guide them in making rules for the aviators. And that was the source of a great deal of trouble and loss of sympathy."

And page 2754:

"I heard General Staff officers say during the war that aviation was not very dangerous. They objected to aviators getting extra pay, which is in the nature of insurance," and "I believe that the General Staff would be more sympathetic toward aviation if more of them understood it as they should do, its difficulties, and knew as much about it as they know about the Cavalry and Infantry."

That as late as April, 1923, the Lassiter Board reported "an alarming condition in the Air Service exists" and that "the committee finds our Air Service to be in a very unfortunate and critical situation" * * * "but measures have not been taken in our country to keep step with this aviation evolution" is convincing evidence that the high command in the Army and Navy did not appreciate the importance of air power in national defense. A careful reading of the evidence taken before our committee convinces us that (outside of the Air Services themselves) there is not now in the Army and Navy a proper appreciation of the importance of air power as a combatant arm.

The current appropriation for the Air Services of the Army and Navy represent 10 per cent of the total appropriations of these departments. When the Budget was presented to the Budget Bureau, a decrease in the total appropriations for these departments was made by the Budget Bureau. The departments were requested to make adjustments in keeping with the decrease, and while the Air Services represented but 10 per cent of the appropriation, the result of the adjustment was a decrease in the Air Service appropriation amounting to approximately 30 per cent of the total decrease of the entire amount.

The evidence on the subject of the attitude of the other service arms toward aviation covered hundreds of pages of the record and is far too voluminous for citation in this report.

The very complete cross index in volume 6 will assist those interested in this subject to readily put their fingers on the testimony leading to the conclusion that (outside of the Air Services themselves and the Lassiter Board) the Army and Navy are and have been very conservative, if not backward, in recognizing the great importance of air power and its possibilities as a combatant arm.

This is not amazing in view of the fact that the higher commands have been trained to other kinds of warfare. Of the 88 members of the General Staff only 2 have had actual experience in flying. (Drum, p. 1881.)

We find as a fact that there still exists an alarming situation both in the Army and Navy Air Services due to shortage of flying personnel and equipment, and that it is due further to a failure on the part of these services to duly appreciate that importance of air power indicated at the beginning of this report.

We also find as a fact that "The aircraft industry in the United States at the present time is entirely inadequate to meet peace and war time needs."

APPENDIX C

THE LASSITER BOARD REPORT

The Lassiter Board report was made more than four years after the close of the World War and nearly two years before the inquiry by your committee.

This Lassiter Board report further stated:

"The aircraft industry in the United States at present is entirely inadequate to meet peace and war time requirements. It is rapidly diminishing under present conditions and will soon practically disappear" (p. 663).

The Lassiter Board report was a unanimous report, and concurred in by the Chief of Air Service. (Drum, p. 1798.)

The Lassiter Board said further:

"The committee finds our Air Service to be in a very unfortunate and critical situation. Since the World War, aviation has come to play an increasingly

important part in military operations, but measures have not been taken in our country to keep step with this evolution" (p. 621).

Secretary of War Weeks, on page 621 of the hearings, said that statement is still true.

The Lassiter Board report is a fundamental document. (Drum, p. 1832.) On page 521 General Patrick stated that he knew that no legislation had been proposed in Congress to put into effect the recommendation of that board. General Drum to the same effect (p. 1799):

"On account of the equal voice of the Army on the one side and the Navy on the other, they have never been able to get together, and it has been withheld, with the result that we have no air policy whatever."

On page 624 Secretary Weeks was asked:

"The Lassiter report recommended that legislation be prepared for introduction into Congress. Do you know whether any legislation was ever prepared or not?"

"Secretary WEEKS. That legislation has not been prepared, or at least it has not been presented to Congress. There are some differences between the Army and the Navy Departments about this subject which have not been ironed out. When the report was available and had been examined, the Secretary of the Navy was having some troubles, or did soon thereafter; or anyway, we never got to any agreement about what should be done."

The Lassiter Board report was dated April 24, 1923. It was a fundamental document. It said our Air Services were in an alarming and critical condition. It said that measures had not been taken in our country to keep step with the evolution in aviation. It recommended legislation to be prepared for introduction into Congress. More than two years have elapsed since that report. Such proposed legislation has never been presented to Congress. The Army and Navy have never agreed on a definite air policy.

The condition now in our Air Services is in the main as described in the Lassiter Board report.

No one who has read the record can doubt the importance and necessity of an inquiry into our Air Services.

We can have no adequate national defense without an adequate air force.

APPENDIX D

IMPORTANCE OF AIRCRAFT

President Coolidge is quoted as having said recently:

"The development of aircraft indicates that our national defense must be supplemented, if not dominated, by aviation."

General Duvall, who was chief of the French Air Service during the war, said of aviation:

"The primary objective of the air force will be the enemy armies, and especially those parts of them in the areas beyond the fighting line, in which it will carry disorder and terror. It will fight in the air for air supremacy and the liberty of action which follows. Its power will grow with the number and development of its airplanes, which will be more heavily armed, will be speedier, and will have greater radii of action. The battle will no longer be confined to the zone occupied by the troops. In fact, the object of that attack may no longer be the opposing army, as this may be neglected, and the desired results may be obtained by a campaign of terror carried on against the enemy country rather than against its armed forces. The decision will be reached in the air and the victor will dictate peace on the ground."

Admiral Kerr, an English naval officer, said:

"War is an affair of communications. No admiral or general would attempt any move unless his communications were assured.

"There is only one arm which can strike at once a real blow at each one and all of the above links in the chain of the enemy's communications. Each side will then endeavor to be the first to attack by air, and unless we are ready to do this our people will feel war as they never felt it in all their history. Poison gas, poison acids, high explosives, and incendiary bombs will be rising from the air wherever there is a factory or arsenal to be destroyed."

Lord Birkenhead said:

"In the last few years an immense and incalculable permanent change has taken place in conditions which is vital and fundamental, and upon which the

security and very existence of this country depends. It has become clear, beyond a doubt, that it is no longer possible to estimate the security of this country in military or naval terms, but that there has arrived a third term, namely, that of an aerial security."

General Groves, an English officer, said:

"War, if it should come again, will begin with an aerial phase which may in itself be decisive. Those not in close touch with the enormous progress in aviation since the armistice, are inclined to underestimate air power and are prone to judge it by the principal air raids of the past. The total weight in bombs dropped upon London in the course of the World War was about 12 tons. To-day several thousands of tons could be dropped on the Capital in the course of 24 hours."

Marshal Foch has said:

"The potentialities of aircraft attack on a larger scale are almost incalculable, but it is clear that such attack, owing to its crushing moral effect on a nation, may impress public opinions to the point of disarming the Government and thus become decisive."

Admiral Fullam said (p. 3090):

"Air power is of comparatively recent origin, but in the past four years it may be said to have reached a dominating position."

Admiral Sims says (p. 2968):

"Airplanes will play a predominant part in the next naval war."

Bonar Law said:

"The whole center of gravity has changed in the matter of national defense from the sea to the air."

APPENDIX E

THE AVIATION INDUSTRY

There is general recognition of the essential relation of the aircraft industry to the national defense. Our security in the air, no less than on land and sea, rests in the last analysis upon our industrial resources. This makes it imperative that a sound and healthy industry be developed and maintained for the design and production of aircraft. This condition can not exist without a change of policy on the part of the Government with reference to the aircraft industry.

The importance of an aircraft industry as a military source of supply is undeniable and was testified to by many witnesses, and denied by none.

In the report of the National Advisory Committee for Aeronautics we find:

"After the very costly lessons of the war it would be folly to say that the Government is not concerned with the state of the aircraft industry. It is concerned that there should be in existence and in a healthy condition, at least an adequate nucleus of an industry. An aircraft industry is absolutely essential to national defense" (pp. 1653-1654).

Former Secretary Weeks said (p. 167):

"We must maintain the aircraft manufacturing industry."

Secretary of War Davis said (p. 659):

"The condition * * * we want to encourage in our national defense * * * is to have as many companies as can live that will be able and equipped to build airplanes in large numbers in case of emergency."

General Patrick, Chief of Air Service, said (p. 130):

"The Secretary of War laid down to me when I first came in office a policy which I have tried to follow. He stated: 'It is important that there should be a nucleus of aircraft manufacturers, ready to expand in time of emergency and capable of turning out the number of aircraft which we may need.'"

Admiral Moffett, pages 358 et seq.

This general recognition of the vital character of the aircraft industry to national defense runs through the evidence of many witnesses and needs no further citation in its support. It is admitted by everyone who pretends to any knowledge of the subject.

Unfortunately for the industry, many serious errors of departmental policy have been committed—errors which have brought the industry to the verge of ruin described in the Lassiter Board report and which have deprived the Nation of a valuable source of strength.

The aircraft industry, which at the close of the World War had an annual production capacity of 21,000 planes, is so far demobilized that it could not now

produce more than 1,200 planes per annum, without sharp expansion in capital and equipment and after months of effort. (Keys, p. 1129.)

For the condition of the aircraft industry the industry itself is partly to blame. Driven to the starvation point for business the industry has in the past not always recognized good business principles nor each other's rights. It has attacked each other's motives and theories and has failed to constantly practice good faith toward each other. (Lawrance, p. 999.)

It has set about to put its house in order and passed a set of resolutions for its good conduct, which if lived up to will help its own situation very substantially. (See the testimony of Mr. Lawrance, p. 999 et seq.)

Another fact which has largely tended to disaster is competitive bidding. The remedy of this is legislation. The recognition of design rights, or, rather, the lack of such recognition, has also been partly responsible for the decline in the industry. Lack of continuity of orders is another.

We fully agree with Brigadier General Drum (1758) when he says:

"The early development of commercial aviation in the United States is essential from the viewpoint of national defense in order to create a reserve of trained personnel and equipment, as well as to create the demand for aircraft which will stimulate the aircraft industry to a point where it will be available for emergency expansion to meet war-time production of planes. The development of commercial aviation in the United States is also essential from an economic standpoint, as the utilization of this new method of rapid transportation will undoubtedly have a far-reaching effect."

And with former Secretary of War Weeks (p. 3019):

"The development of the aviation industry depends on production demands from both military and civil aviation. The demands from military aviation will not be sufficient to maintain a large healthy aircraft industry therefore the aircraft industry must largely be developed under the stimulus of commercial aviation which is an important aid to the national defense. In my opinion, the Government should encourage the development of commercial aviation in every practical way."

There is really no dissent from these eminent opinions. We have an absolute unanimity of opinion as to the importance of commercial aviation, and the necessity of the Government encouraging its development "in every practical way."

A reference to the cross index will readily supplement the statements given above.

GOVERNMENT AID TO COMMERCIAL AVIATION

The Post Office Department has done excellent work in the transportation of mail by air and has availed itself of a splendid opportunity for the development of commercial transportation by aircraft.

It has demonstrated that airplanes are entitled to a permanent place in the general scheme of postal transportation. In order to do this they must be used for continuous flight of mail over relatively long routes. The Post Office Department has carried on night flying—a thing never undertaken before on long routes and regular schedule. It has done this with signal success.

Since July, 1924, the Post Office Department has operated a continuous transcontinental air mail service, flying at night over lighted airways. Its service has been eminently satisfactory and has more than justified the cost to the Government.

The flying equipment of the air mail consists of surplus Army airplanes of the De Haviland type, remodeled by the air mail in its own shops. These De Haviland are war-built planes and poorly suited for carrying mail.

Some time ago the Post Office Department created a competition among the airplane manufacturers, with the view of developing a practical type of air mail transport.

"We have told them (manufacturers) that we want a ship that will carry at least a thousand pounds and that will fly at least 100 hours cruising speed and land 50 miles an hour slower and will have a service ceiling of some 15,000 or 17,000 feet. * * * So that between now and the 15th of March we expect to have offered to us at least six airplanes, which, unless these manufacturers have not taken advantage of our invitation, will be distinctly an advance in the commercial airplane itself." (Henderson, p. 280.)

The air mail service is forward looking and progressive. It is assisting materially to bring into being commercial aviation. It needs and deserves every support that can be legitimately given to it by the Government and the people.

APPENDIX F

COMPETITIVE SELECTION OF TYPES

The selection and development of new and improved types of airplanes is an important and necessary function in the progress of air navigation. This has been recognized by our air services by calling for competitive bids from time to time for new designs of airplanes. While approving of the general purposes of the air services in this matter, we can not give our entire approval of the methods of procedure. We find instances in which the time allowed bidders to prepare and submit plans and designs has been entirely inadequate for the presentation of the best designs of which the bidders were capable. The limited time allowed has caused bidders unnecessary expense and an insufficient opportunity to work out most desirable designs. The limited periods allowed for offering designs favored bidders with developed types and worked to the disadvantage of those desiring to present new developments. The limited opportunity afforded tended to deny to the Government the privilege of fully availing itself of the inventive genius of the country in the development of superior airplanes.

This committee desires to express itself positively as believing that all competitions invited by any department of the Government for the purpose of developing new and better types of airplanes and engines should afford a full and fair opportunity for all bidders to have adequate time and full and impartial consideration of their offered productions. All prospective bidders should be given due notice. Unreasonable terms in contracts, particularly as to time of completion and as to changes and extras, should be avoided. The contractor for production should be given ample opportunity to complete his contract on an economic basis. Such a time should be given by the terms of the contract and not depend upon the grace of the department making the contract.

Any design competition that does not give a full and equal opportunity to all and result in the award to the design of greatest excellence would be a reproach to our Government.

APPENDIX G

MILITARY VALUE OF PRESENT AIRCRAFT

As to the military value of our present aircraft in the plan of national defense, General Patrick said, on page 529:

"I agree very thoroughly with the report of the Lassiter Board, that we are not properly equipped to protect ourselves, certainly not in what the War Department designates as a major emergency; that is, if we are called upon to defend ourselves against the greatest combination that could be brought against us. We need to be strengthened both in personnel and material."

That most of our airplanes are neither modern nor suited for the purposes for which they would be used in a war emergency is best illustrated by the testimony of General Patrick on page 543; this evidence is the same as General Patrick gave before the House Committee on Appropriations:

"Mr. REID (interposing). I call your attention—you say that you have no war-time planes on hand at the present time?"

"Major General PATRICK. No; I said by the end of this fiscal year there would be no more war-time planes that I shall endeavor to recondition or put in service."

"Mr. REID (reading):

"Actually on hand on the 30th of September of this year—and these figures, I am satisfied, are correct—of service types I had, of observation planes, 820; of bombardment planes, 102; of pursuit planes, 190; of attack planes, 9; making a grand total of 1,121 planes of those tactical types."

"Major General PATRICK. Yes, sir."

"Mr. REID. (continuing reading):

"Mr. ANTHONY. Were they serviceable?"

"General PATRICK. Not all of them. We have divided them also into three classes, A, B, and C, just as before. That means that the A, B, and C classes are first, second, and third line planes. The first line will be the most up to date. They are the planes we would order in cases of a war emergency. The second-line planes would not be ordered for use in an emergency, but they compare reasonably well with foreign types, and they are fit for war use. The third line, the reserve planes, are unfit for hard usage in war, and they are seriously handi-

capped in their relative performance. They are useful merely for tactical training. Of the observation planes, I have none of the first class. Of the second-class planes that now compare reasonably well with what we know foreign countries have, I have 138. Of the third class, which are absolutely unfit for war use, and which are of value merely for tactical training purposes, I have 682.

"Mr. ANTHONY. Have you put any of your planes which were inherited from the war in the first class?

"General PATRICK. I do not put any of them in the first class.

"Mr. ANTHONY. Are the first-class planes all planes that have been manufactured since the war?

"General PATRICK. Yes; and not only manufactured, but designed since the war. In addition to those, I have on hand of training planes of the reserve class 379. I have no first class. Of what I call the transition or advanced training plane I have 92, making a total of those types of 471, of which none are in the first class.

"Mr. ANTHONY. How many planes have you on hand that were built during the war, or are being built from war stock?

"General PATRICK. According to the figures, of the total I have on hand 1,291 are war-built planes, of which 471 are of the training type and 820 of the tactical type.

"Mr. ANTHONY. All of what are called the D-H type are war-built planes?

"General PATRICK. Yes, sir.

"Mr. ANTHONY. What are you using them for now?

"General PATRICK. I am using them for observation purposes, for training, and for photographic work. I might add that I am also using them for attack planes because I have no better planes for that purpose."

"Mr. REID. Now, those are all referring to the war-time planes?

"Major General PATRICK. Yes; those are.

"Mr. REID (continuing reading):

"Mr. ANTHONY. Are they perfectly serviceable for the first three purposes you mentioned?

"General PATRICK. They are, with this amendment, that they are not the planes I would use in a war emergency."

And again, on page 576, General Patrick said, in regard to the attack planes that the United States has:

"Mr. REID. Have you got any attack planes?

"Major General PATRICK. No, sir.

"Mr. REID. You have no attack planes?

"Major General PATRICK. I have some DH planes that I am using as attack planes.

"Mr. REID. But those are old planes?

"Major General PATRICK. Yes, sir.

"Mr. REID. Those are planes that you inherited from the war?

"Major General PATRICK. Yes, sir.

"Mr. REID. You have no single attack planes of the first class?

"Major General PATRICK. No, sir."

APPENDIX H

Army planes, September 30, 1924

	First line	Second line	Third line	Total
Observation.....	0	138	682	820
Bomber.....	91	11	0	102
Pursuit.....	25	165	0	190
Attack.....	0	0	9	9
Training.....	116 1 379	314 2 92	691	1,121 471
Total.....				1,592

¹ Reserve.

² Advanced.

Above from Major Walsh (supplementing statement by General Patrick) and Secretary Weeks.

In commission.....	829
In storage.....	763
Built since war.....	140
War built.....	623
	<hr/> 763
To be reconditioned, at \$5,000 each.....	390

NAVY DEPARTMENT,
BUREAU OF AERONAUTICS,
Washington, December 8, 1925.

MY DEAR MR. LEA: In compliance with your verbal request of this date I am forwarding herewith certain information covering the aeronautic organization of the Navy for use by the select committee of inquiry.

The attached chart gives the status of all naval aircraft on hand or on order as of July 1, 1925, divided into groups, as I believe you wished. Of the aircraft listed as service types, all were delivered within the past five years with the exception of the VE7SF and VE-7 planes, which were delivered continuously during 1920 and 1921. Also of the planes listed as "Obsolescent, to be used until expended" the following have been delivered within the past five years: DT-2, DT-4, MO-1, and NO-1.

With reference to the number of naval aviators trained during the past four years (July 1, 1921, to July 1, 1925), you are advised that a total of 267 officers completed the naval aviator's course and 48 enlisted men completed the naval aviation pilot's course.

Trusting that the above information will be satisfactory for your purposes, I am,

Very sincerely yours,

W. A. MOFFETT,
Rear Admiral, United States Navy,
Chief of the Bureau of Aeronautics.

Hon. C. F. LEA,
Select Committee of Inquiry into Operations
of the United States Air Services.
House of Representatives, Washington, D. C.

NOTE.—The chart referred to in the above letter showed planes as follows:

Service types:	
In serviceable condition.....	196
Unserviceable.....	62
On order.....	163
Obsolescent:	
Serviceable.....	365
Unserviceable.....	56
Experimental:	
Serviceable.....	34
Unserviceable.....	2
On order.....	20
Obsolete:	
Serviceable.....	78
Unserviceable.....	56

Of the serviceable machines of the service types, there were: 34 VE7SF, 19 VE-7. Of the obsolescent planes, there were: 45 DT-2, 3 DT-4, 32 MO-1, 3 NO-1.

* * * * *

The members of the committee are unanimous in concurring in this report. Mr. Reid reserves the privilege of filing further views on his part.

SPECIAL CONCURRING REPORT BY MR. REID

The committee, as a whole, recommends a department of national defense, and points out glaring defects in the present system, or lack of system, to indicate the need of a complete reorganization of our national defense. In this I fully concur.

The committee, however, does not present to Congress an outline of how this proposed department should be organized, and I believe that this committee, having gone into the question very thoroughly and being in possession of all the facts necessary upon which to present an outline, should have done so.

I believe that there should be included in this report for the guidance of Congress, statements of authorities on how the air forces should be organized.

As the report states, a great many remedies were suggested for the present deplorable condition of our air power, which included a unified air force, a separate air force, aviation corps in both the Army and the Navy, and yet no statement of how these proposed plans would work is given in the report of the committee.

The committee states that all branches of national defense should be unified and harmonized into a single, efficient department, and this naturally includes coordination and unification of all air services. The very purpose of the recommendations of the committee is to end duplication and differing policies.

The proposed department of national defense would be in the hands of a secretary charged with full responsibility for the Nation's defense, acting, of course, under the President of the United States.

His duties would be to determine matters of fundamental policy, details would be assigned by him, naturally, to assistants, one for the Army, one for the Navy, and one for air.

Howard Coffin, a member of the President's Aircraft Board, testifying before our select committee, volume 2, page 1217, said, in answer to a question on this subject:

Mr. PERKINS. But that there should be created an entirely new Air Service, under neither the viewpoint of the Army or Navy, but with a view of uniting our forces into an Air Service of the United States?

Mr. COFFIN. Yes; but with the most sympathetic interest of those services.

And he presented a diagram showing a secretary of defense, with undersecretaries for War, Air, and Navy (p. 1245).

Maj. Reed Landis said, on page 1820:

Mr. LANDIS. But if it is primarily an aerial war it seems to me that the commanding officer ought to be a man who is an air specialist.

Mr. REID. Who is going to determine that? The Army would never agree to that proposition, and neither would the Navy, I take it.

Mr. LANDIS. That is another reason for me favoring a unified air service.

Mr. REID. Do you make a distinction between a unified service and what we call general defense, with one person in charge of the defense of the country?

Mr. LANDIS. I think concentration of authority in time of war is an absolute necessity, and I believe that a unified air service is probably one step toward

unification of the national defense, under a secretary of national defense, or whatever you would call him, having under him the three branches—Air, Army, Navy.

Brigadier General Mitchell, on page 1689, said:

Brigadier General MITCHELL. I think there is no question but what a department of national defense, with subsecretaries to run the air and the water and the land, is necessary. The reason we advocate this so strongly at the present time, Mr. Lea, is that we are losing valuable time every year by being retarded with the present operation, and we believe that the developments in the near future will force a department of national defense.

Mr. LEA. Now, if the trouble with our present organization is not fundamentally in the organization itself, but in the particular personnel that lacks vision and initiative and progress to take proper advantage of this new military development, might it not well be a question of whether or not the problem was not to try to shove out that personnel and put our machine into the hands of better operators, rather than to try to change the machine?

Brigadier General MITCHELL. No; I do not think so. I think the thing is fundamentally wrong. It is based on a force that operates on the land and on the water and in the air. In each case where it is used they regard the air force as an auxiliary to what to them is the main force. We believe when we are fighting an air battle over the sea, it is nothing that the sea forces have anything to do with. When we are fighting a battle in the air over the land, the Army has nothing to do with it on the land. But all must be combined under one general command to give the best return.

Pending the establishment of a department of national defense, I believe that the only alternative to give aviation its rightful place in the national defense system would be the establishment of a unified air service, and how a unified air service would function is shown by the record.

HOW A UNIFIED AIR SERVICE WOULD FUNCTION

From the testimony it would appear that with a unified air service the defense system would be organized as follows: War, Navy, Air, with an officer at the head of each department; or they could be all combined under one secretary of defense, with undersecretaries for War, Navy, and Air.

The present naval aeronautics (including Marine Corps aeronautics), the Army Air Service, and the Post Office air service would be handed over for administration, supply, promotion, etc., to the secretary for air. The Post Office planes would be operated by civilian pilots, or by Army or Navy pilots after leaving the military services. Air service for purposes of other departments of the Government would be furnished when required by the air secretary from the military or civilian personnel under his administration.

At the start, a certain portion of the combined force would be handed back to the Navy for air work with the fleet only and such coast-defense work as now allotted to the Navy until such time as it may be eventually turned over to the Army, or to the air force. This personnel would be under the absolute command of the Navy and would constitute its *air service*.

A certain portion would also be handed over to the Army for its purposes such as observation, as needed by the Army. This would be the Army's *air service*.

There would be the third military air component, the *Air Force*—of bombardment, attack, and pursuit aviation, and airships for special strategic missions, either in connection with ground troops, the fleet or independent of them.

A vast amount of testimony was given by Army and Navy officers, as well as others, concerning the subjects of unified air service, separate air force, independent air force; and as I consider this a most important part of the entire hearing, I am presenting a fair review of the evidence on these subjects, subjoining copious footnotes so that the sources of the statements can be readily located in the printed record.

There may seem to be needless repetition herein, but owing to the fact that the review is subdivided I have decided to repeat where it is necessary for continuity of thought. I have also included a list of definitions of aeronautical terms that will be useful.

TERMINOLOGY

In this review "aeronautics" is used as a general term to cover the entire science and art of the design, construction, and operation of aircraft of any type.

"Aviation" is that branch dealing with gasless, heavier-than-air aircraft, of which the airplane and helicopter are examples.

"Aerostation" is that other branch which has to do with aircraft whose support is principally maintained by a gas lighter than air, of which the airship and the balloon are examples.

Under "military aeronautics" is included all those matters pertaining to aerial warfare, whether of the Army, Navy, or of the independent air force.

The "U. S. Air Service" is the present official title of the air organization in the Army.

The "Bureau of Aeronautics" is the present official title of the air organization in the Navy.

By "air service" (not capitalized) generally is meant performance of work by aircraft and their accessories for other organizations.

By "Army air service" is meant that complement of air personnel and material which operates permanently as an auxiliary to the ground troops in carrying out their missions on the ground, such as observation.

By "Navy air service" is meant that complement of air personnel and material which operates permanently as an auxiliary to the fleet in carrying out its missions on the sea, such as scouting.

By "air force" is meant that complement of air personnel and material operating as a striking force, independently or in conjunction with other services in special and strategic missions.

By "unified air service" is meant a "concentration of air activities of the United States—Army, Navy, and civil—within the direction of a single Government agency created for the purpose" coequal in importance with the Departments of War, Navy, Commerce, etc.

PRESENT SYSTEM OF AIR DEFENSE

As a general proposition, the Army is intrusted with the defense of America on land. To the Navy is intrusted the defense of our country by sea. The defense by air is now divided between the Army and Navy.

A complete lay-out of strategy and tactics has been developed through the ages for land warfare. The same is true for marine

clashes. Both, however, are always undergoing at least minor changes.

Now, war in and through the air has introduced many new basic and minor features. Rapid and important changes in tactics and strategy are continually taking place and these have their lesser effect on the problem of land and sea.

The Army has always specialized in its field—land operations. The Navy has specialized in its—sea operations.

Operations in the air might be considered a subject for intense specialization, but to date these are auxiliary to the two established branches of the national defense.

ARMY

Under the present defense system the U. S. Air Service is a combatant branch of the Army, like Artillery, Infantry, Cavalry, Chemical Warfare, etc. It consists of officers and men who have transferred from other branches or who have originally elected the Air Service during the World War. Once in the Air Service, they stay in it for life unless transferred at their own request. The executive of this branch is the Chief of Air Service, who, like the Chief of Artillery, etc., reports to the Secretary of War.

THE NAVY AND MARINE CORPS

Aeronautics in the Navy is more complicated. From an administrative and technical viewpoint naval aeronautics is administered through the Bureau of Aeronautics. From an operating point of view naval aeronautics functions in a similar manner to such special services as submarines, which require special training but are manned by line personnel so trained.

The Marine Corps of the Navy also has flying personnel and equipment. The Marine Corps air service is operated from a technical standpoint through the Bureau of Aeronautics, from an administrative view through Marine Corps headquarters, and for operations it functions with the Marine Corps in the same way that the Navy aeronautics is operated with the Navy.

Personnel is detailed to aeronautics in both Navy and Marine Corps for temporary periods. The chiefs of these two services report to the Secretary of the Navy.

The entire defense project, of course, takes in the National Guard and the Reserve Corps of both the Army and Navy.

The Aeronautical Board, composed of members of the Army and Navy, is a coordinating body for military aeronautics.

TRAINING—PERIOD OF SERVICE

Under the present defense system, all West Point and all Annapolis cadets are now given increased instruction in aeronautics, and all will have an opportunity, it is planned, to actually fly—as passengers. So the officers of these two arms will in future be expected to have at least a very limited knowledge of the possibilities and limitations of aircraft.

Those cadets of the Navy who elect aeronautics must be competent naval officers as well. In addition to flying, including all its particular requirements, they must at all times be capable of assuming any duty of any other naval officer up to command of the fleet.

Those who elect the Air Service of the Army spend all their energies in flying only and its requirements, and they are not required to command Infantry, Artillery, or other branches of the service.

CIVIL AERONAUTICS AT PRESENT

There is at the present time no Federal regulation of air traffic, inspection of machines and registration, or licensing of pilots.

A comparatively large number of State and municipal laws and ordinances have already been passed, designed to regulate air traffic. However, air travel is primarily interstate and the duty of regulation is logically Federal.

The Government offers no encouragement or aid, direct or indirect, to private enterprise in civil aeronautics and progress has been naturally much retarded.

The railroads were assisted in their inception by enormous land grants. American shipping receives an indirect subsidy and, in addition, is furnished such aids to navigation as suitable weather reports by radio and otherwise, lighthouses, buoys, lightships, maps, ice patrol, etc.

The only civil departments of the Government operating their own aircraft are the Post Office and Treasury (Coast Guard).

Other departments using aircraft to a constantly growing extent are the Departments of Agriculture, Interior, and Commerce. These employ personnel and equipment loaned for special occasions by the Army or the Navy. As time passes, this civil use will rapidly increase in volume and it will soon be no longer possible for the military forces to furnish such assistance.

From the testimony itself and from observations indicated thereby, immediate steps should be taken to place civil aeronautics upon a firm foundation through regulation and assistance in the way of flying beacons, weather reports, aerodromes, etc.

Our Government is one of the very few countries signatory to the International Air Convention which has failed to ratify it.

Flying officers in both the Army and Navy have expressed adverse criticisms of the present status of military aeronautics and their aspirations have been expressed in proposals for various forms of a "unified air service," "united air service," and an "air force" (the latter an air force independent of the air service allotted to the Army and Navy); or for an "air corps" within the present military establishments.

They feel that aeronautics is not given its proper valuation in the general scheme of defense—

Naval flying is sufficiently important to demand specialization to the same extent as service in the Infantry, or Artillery, Cavalry, etc.

It does not make for efficiency in naval aeronautics to detail men to the air for a period and then return them to the line in order that they may obtain normal advancement.

Flying officers in the Army are discriminated against in the matter of promotions under the present system.

Reserve flyers of both services get insufficient training.

Aeronautics has no school such as West Point or Annapolis.

Aeronautics is not properly represented in the General Board of the Navy and the General Staff of the Army.

Supply of new and up-to-date aircraft is insufficient.

Accidents and fatalities are largely due to the use of obsolete and poorly designed aircraft.

The older services are now of lessened importance to national defense.

There is lack of "unity of command" in national defense, not only with respect to aeronautics but to coast defense.

The General Board and General Staff are unwilling to admit present actualities and potentialities of aircraft.

AIR POWER

Air power has been defined as the might of a country to wage war through the air forces, either alone or supported by land or sea power.¹

A rather great volume of testimony was taken in discussion of its value relative to the land and sea forces and of its intrinsic value as a single arm of defense.

That an air force, independent of the land and sea power, is the only arm "which can strike at once a real blow at each one and all of the links in the chain of the enemy's communications"² is, of course, obvious; and from this priority of striking time the air force must be considered as the "first line of defense."

VALUE OF AIR POWER

The testimony—Army, naval, and civilian—before the committee is unanimous in support of the "indispensability"^{3 7} of aircraft, both alone and in cooperation with the military forces, and the bulk of it is clearly to the effect that "the potentialities of aircraft * * * are almost incalculable"⁴ and that "our national defense must be supplemented, if not dominated, by aeronautics."⁵

Considering the probable increase in the power of aircraft in future, this opinion must outweigh the certain testimony placing aeronautics as a mere "adjunct" or an "auxiliary"⁶ to land and sea operations.

The uncontroverted evidence^{3 7} presented in support of this indispensability and potentiality is so definite and overwhelming that one

¹ Maj. Rayeroff Walsh, U. S. A., 1699.

² Admiral Kerr, 520.

³ Admiral Hilary P. Jones, 2941; Capt. E. G. Land, U. S. Navy, 1336, 1335; Admiral Moffett, 386, 383, 362; National Advisory Committee for Aeronautics report cited by Admiral Moffett, 1655; General Pershing, 1728.

⁴ Marshal Foch, 520; Admiral Sims, 2063.

⁵ President Coolidge (520); ex-Secretary of War Baker, 1267.

⁶ General Drum, 1761, 1873; Sir Douglas Haig, 1724; Dickman Board, 1724; General Pershing, 1727, 1729; Secretary of the Navy Wilbur, 2262; Admiral Moffett, 1658; Lieut. R. A. Oistie, U. S. Navy, 2177; Theodore Roosevelt, 2345, 2346.

⁷ Admiral Fisher, 2939; Brig. Gen. Lord Thompson, 536; Marshal Foch, Field Marshal Haig, General Ludendorff, cited by Crowell, 2356; Major General Trenchard, cited by Perkins, 2357; Admiral von Scheer, cited by Admiral Fullam, 3103; Admiral Sir Percy Scott, cited by Admiral Fullam, 3100; Admiral Fullam, 3090; Gen. Mason M. Patrick, General Duval, Admiral Kerr, Bonar Law, Lord Birkenhead, General Groves, Marshal Foch, 520; Lieutenant Arnold, 713; Reid Landis, 1821; Admiral Sims, 2963, 3004, 3005, 2960, 2987, 2968, 2988; General Patrick, 529; Admiral Fiske, 3096, 740, 3100, 3070, 3082; Col. William Mitchell, 2034, 2035, 291, 2037, 1894, 336, 2759, 1925; Starr Truscott, 718, 719, 720, 721; Admiral Jellicoe, 1293; Lieut. Commander Edwards, U. S. Navy, 1292, 1293, 1321; Admiral Beatty, 723; Lieut. Leigh Wade, 707; Secretary of War Davis, 665; Ex-Secretary of War Weeks, 617, 635; Howard E. Coffin, 1199, 1198, 1237; Arthur Brisbane, 901; B. F. Castle, 1041; Edw. Rickenbacker, 2169, 2156; Leon Cammen, 3151; Leslie P. Kefauver, 2078; National Advisory Committee for Aeronautics report, 1652; concurred in by President Coolidge, 1641; Maj. T. D. Milling, 2262, 2263; Benedict Crowell, 2355; American Aviation Mission (for list of members see note 1234).

is convinced that its importance demands that, at least, air power must have "a coordinate voice in the councils of the Nation with sea power and land power."⁸

THE UNIFIED AIR SERVICE

The American aviation mission's definition is concise and appears to fully represent the general aims of the proponents of the united air service or united air force.

The concentration of air activities of the United States—military, naval, and civilian—within the direction of a single Government agency created for the purpose, coequal in importance with the Departments of War, Navy, and Commerce.

This means a secretary of air, obviously.

There is also the proposal to put these Departments of War, Navy, and Air under a secretary of national defense, with undersecretaries of War, Navy, and Air.

Considerable divergence of opinion is found among those who favored the secretary for air controlling military, naval, and civil aeronautics (or the air corps as an intermediate step⁹) and those who were definitely against either but favored maintaining aeronautics in the Army and Navy under the present system,¹⁰ or under the present system but placed under one secretary for defense.¹¹

The testimony preponderates in favor of the ultimate organization of our air defense within the limits of the definition first foregoing.

In addition to the general objections to the unified air service mentioned foregoing, specific objections were registered:

Who is to control the aircraft carriers, a line officer of the Navy or a unified air service officer.¹²

Assignment to Navy of aviators unskilled for naval purposes.¹³

Planes too large for carriers.¹⁴

Possibility of aviators serving with Navy not under Navy control.¹⁵

No supply if dependent on another branch.¹⁶

Absence of unity of command.¹⁷

⁸ Col. William Mitchell, 2758.

⁹ General Patrick, 521, 1896; Field Marshal Sir Henry Wilson, 1702; Lieut. Col. H. E. Hartney, 2106; Reed G. Landis, 1819, 1820; Jacques M. Swaab, 2250; Maj. Carl Spatz, 2246; Col. Wm. Mitchell, 2111, 1677, 1671, 1669; Maj. Raycroft Walsh, 1699, 1709, 1710; Maj. T. D. Milling, 2259; Lieut. Frank O'D. Hunter, 2240; Lieut. C. B. Austin, 2241; Benedict Crowell, 2355; L. D. Gardner, 329; Col. Paul Henderson, 288; L. L. Driggs, 2210; Benedict Crowell, 2355; Lieut. Leigh Wade, 707; Edw. Rickenbacker, 2159, 2169; P. N. Bellinger, U. S. Navy, 2367; Lieut. B. R. Holcombe, U. S. Navy, 2186, 2188; Lieut. J. K. Montgomery, U. S. Navy, 2107, 2097, 2098; Lieut. T. D. Borner, U. S. Navy, 2192; Lieut. F. O. Rogers, M. C., 2197; Lieut. R. A. Ofstie, U. S. Navy, 2181; Lieut. G. R. Henderson, U. S. Navy, 2202; Lieut. A. J. Williams, U. S. Navy, 2206; C. M. Keys, 1432, 1431, 1152, 1153; Hon. F. L. La Guardia, 2382, 1665, 1664; Col. Wm. Mitchell, 1915. American Aviation Mission (which included Benedict Crowell; Howard E. Coffin; Capt. H. C. Mustin, U. S. Navy; Col. Halsey Dunwoodie; Lieut. Col. J. A. Blair, G. S.; C. M. Keys; George Houston; S. S. Bradley), 1897.

¹⁰ General Drum, 1787, 1875, 1726, 1760, 1879; Admiral Moffett, 379 361; Ex-Secretary of War Weeks, 626, 3059, 3049; Secretary of War Dwight Davis, 663; Ex-Secretary of War N. D. Baker, 1726, 1235; Ex-Lieut. W. S. Holt, U. S. Army, 2106; Theodore Roosevelt, 2367; Admiral Hilary P. Jones, 2918; Secretary of Navy Wilbur, 364; Commander Byrd, U. S. Navy, 2367; Admiral Fiske, 3070; Admiral Sims, 3014; Capt. A. W. Johnson, U. S. Navy, 1999; Lieut. Commander Atlee Edwards, 1317; Capt. E. G. Land, U. S. Navy, 1329, 1331; Commander Richardson, 1492, 1493; Commander Whiting, 2142, 1464; Lieut. C. A. Sprague, U. S. Navy, 2200; National Advisory Committee for Aeronautics, 1637.

¹¹ Capt. E. G. Land, U. S. Navy, 1334.

¹² Commander Whiting, 1466, 1464.

¹³ Admiral Moffett, 362; Theodore Roosevelt, 2349; Admiral Sims, 2985.

¹⁴ Captain Land, U. S. Navy, 1316; Edwards, 1315.

¹⁵ Admiral Sims, 2968.

¹⁶ Admiral Moffett, 362.

¹⁷ Commander Whiting, 1464.

Other witnesses, however, fully answered these objections¹⁸ by argument and by citation of maneuvers¹⁹ and general orders of the War Department.²⁰

As to the specific objections mentioned foregoing, it is believed that they represent merely unwarranted anticipations of minor difficulties.

INDEPENDENT AND COORDINATED FUNCTIONS

From the testimony it would appear that with a unified air service,^a the defense system would be organized as follows:

War, Navy, Air, with a cabinet officer at the head of each department.^b

The present naval aeronautics (including Marine Corps aeronautics), the Army Air Service, and the Post Office air service would be handed over for administration, supply, promotion, etc., to the secretary for air. The Post Office planes would be operated by civilian pilots, or by Army or Navy pilots after leaving the military service. Air service for purposes of other departments of the Government would be furnished when required by the air secretary from the military or civilian personnel under his administration.

At the start a certain portion of the combined force would be handed back to the Navy for air work with the fleet only and such coast defense work as now allotted to the Navy until such time as it may be eventually turned over to the Army or to the air force. This personnel would be under the absolute command of the Navy and would constitute its *air service*.

A certain portion would also be handed over to the Army for its purposes, such as observation, as needed by the Army. This would be the Army's *air service*.

There would be the third military air component, the *Air Force*—of bombardment, attack, and pursuit aviation and airships for special strategic missions, either in connection with ground troops, the fleet, or independent of them.

That takes care of present personnel.

THE AIR COLLEGE

On the acknowledgment of the importance of air power herein made, it follows that there is warranted proper preparation and training for the air to the same relative extent.²¹

It is obvious, then, that men should be trained for the air as for the Army and Navy and we have West Point for the Army and Annapolis for the Navy, and there should be established an air academy on a relative par with these two institutions.

From this air academy the students would go to the Army or to the Navy for their air services, to the air force, into civil branches of Government flying, or to private life.

There is an expression in opposition to the air academy to the effect that eventually all air personnel would feed in therefrom and

¹⁸ Colonel Mitchell, 1671, 2765; Commander Whiting, 1467; General Patrick, 531, 532; Major Milling, 2274; C. M. Keys, 1432; Maj. Raycroft Walsh, 1701-1708; Reid Landis, 1820; General Drum, 1830.

¹⁹ Major Walsh, 1701-1708.

²⁰ Major Walsh, 1702-1704.

^a Major Milling, 2256, 2259; Commander Whiting, 1466.

^b There is also the proposition of then combining all three under one secretary of defense, with undersecretaries for War, Navy, and Air reporting to the former now commonly accepted.

²¹ Colonel Mitchell, 335, 1891; Major Milling, 2260; Howard Coffin, 1278, 1279, 1243, 1244; American Aviation Mission, 1225.

that the "Navy and the Army personnel would disappear within a few years."²²

SUPPLY AND SUNDRY

The unified air service would have a central system of supply. The Army, Navy, Post Office, and other air services and the Air Force would draw on the central organization. The special needs of each branch would be served through the technical cooperation of the branches centered in an engineering branch of the unified air service.

Air promotion would be always within the unified air service and under its control and would not be dependent upon vacancies in the line of the Navy and the various branches of the Army as at present.

PROMOTION, RETIREMENT, REPLACEMENT

In a preceding section of this review is illustrated the working of the unified air service.

The initial organization is, of course, made up of existing Army, Navy, and Post Office air personnel.

The problem of promotion and retirement or disposal of the flying personnel after a flying age limit is passed was discussed by the witnesses before the committee.

Mention has been made of the air college and the expectation that the present air officers of the Army and Navy will eventually have severed their connection with the military forces through one cause or another and will be replaced by those coming directly from the air college.

There were witnesses who expressed the fear that under a unified air service there would be "a very large personnel to get rid of in some way and it is going to be a very expensive thing to do," through retirement or paying them off by a fixed sum²³, and naval witnesses urge that the Navy should supply its own air personnel, in opposition to the unified air service and train them for naval duties as well so that they might continue their naval careers at sea.²⁴

Other evidence, however, indicates no apprehension may be noted on this score and suggests a normal promotion, based on the expectation of life, with even the possibility of a transfer to other branches.²⁵

The life expectancy of the flying personnel is said to be less than one-third of that of the personnel of the other military services of the United States, and consideration should be given to the subjects of promotion, pay, insurance and retirement, for the benefit of the aviators in the military and naval services. It is well to note that the statistics of the air services show that the life expectancy of flyers is only fifteen years.

Special notice should be taken of the report of the Shanks Board of 1922, that the single list promotion affects the Army Air Service officers unfairly.²⁶

²² Commander Whiting, 1467.

²³ Commander Whiting, 1473, 1474; Secretary Wilbur, 363; Lieutenant Commander Edwards 1327.

²⁴ Admiral Moffett, 382.

²⁵ General Patrick, 531, 523; Am. Av. Mission, 1225, 1226.

²⁶ General Patrick, 523.

THE AIR CORPS

The "air corps" for both the Army and the Navy has been offered as a temporary compromise between the present system and the ultimate unified air service. The testimony on this point, however, is rather meager, perhaps due to the fact that the committee felt the general public was well enough acquainted with the corps.

It is pointed out in behalf of this proposal, and it is applicable as well to the unified air service, that the "present national defense organization is inefficient in that no single agency has this responsibility [development and utilization of air power] as a primary and exclusive function."²⁷

As illustrating this substitute, there may be taken the Marine Corps in the Navy Department, with which service everyone is familiar. Under this plan the Navy and the Army would have each an air corps similar in plan and organization to the marines.²⁸

There is, of course, some objection to the corps plan, but the opposition is much less than that to the unified air service, as determined from the testimony.²⁹

THE LASSITER BOARD PROGRAM

The Lassiter Board, convened by the Secretary of War, made a rather exhaustive report on Army aeronautics, which was approved in principle by Secretary of War Weeks in 1923.³⁰

In general, the board recommended a 10-year program of Army air development based on an appropriation of \$25,000,000 a year and involving an increase in personnel of the Air Service from 1,100 officers and 8,000 or 9,000 men, as now authorized, to 4,000 officers, 2,500 flying cadets, and 25,000 enlisted men, with 2,500 planes, 20 airships, and 38 balloons, to be attained by progressive development over this given period.

It was pointed out as an argument against the unified air service that the proposals of the Lassiter Board actually furnished the independent air force on which so much stress is laid in the unified air service program and should be acceptable to the latter's adherents under the present military defense system.³¹

The tactical organization under the Lassiter report was based on the following principles:

1. Observation air service an integral part of divisions, corps, and armies, with a reserve under general headquarters.
2. An air force of attack and pursuit an integral part of each field army, with a reserve under general headquarters.
3. An air force of bombardment, pursuit and airships directly under general headquarters for special and strategic missions, either in connection with ground troops or independent of them.³²

²⁷ General Patrick 522, 532.

²⁸ General Patrick, 532, 1896, 524, 523, 522, 1800, 521; Major Spatz, 2248; Lieutenant Borne, U. S. Navy, 2194; Lieut. A. J. Williams, U. S. Navy, 2206; Lieutenant Holcombe, U. S. Navy, 2182, 2186, 2189.

²⁹ General Drum, 1826, 1827, 1760; Theodore Roosevelt, 2360; Admiral Shoemaker, 2336; Commander Whiting, 2142.

³⁰ Secretary Weeks, 1769, 3053, Drum, 1842, 1728, 1774, 3033.

³¹ General Drum, 1826, 1832, 1881, 1740; Secretary Davis, 673.

³² Drum 1728, Weeks 3033.

The Lassiter Board found the Army "Air Service to be in a very unfortunate and critical situation."³³

Since the World War, aeronautics has come to play an increasingly important part in military operations, but measures have not been taken in our country to keep step with this evolution.³³

The aircraft industry in the United States at present is entirely inadequate to meet peace and war time requirements. It is rapidly diminishing under present conditions and will soon practically disappear.³³

Other testimony confirms this.³⁴

The recommendations of the Lassiter Board, however, do not appeal to the adherents of the unified air service idea,³⁵ although it is a step in the direction of the unified air service "and a rather long one but, of course, it does not go all the way."³⁶

The Lassiter program was submitted to the Joint Army and Navy Board for consideration in connection with a Navy program with a view to submission to Congress. The two programs were approved by the Secretary of the Navy, but the Secretary of War qualified his approval, as he desired a greater percentage for the Army. This was not satisfactory to the Secretary of the Navy, and the matter was referred back to the Joint Army and Navy Board for adjustment, and there it still rests.^{36a}

The Lassiter Board report, and that of the Navy board, of course, leave the air power of the Army and the Navy within these two services, and obviously the same general objections made to the present organization will largely apply to these programs.

"INERTIA"—"CONSERVATISM"

One is compelled to take cognizance of the rather voluminous testimony charging the Army and Navy officials and boards with "conservatism," "influences," "interests," and the like, which "deny to aeronautics the place it should have in the military scheme of the country,"³⁷ and it must appear from the testimony³⁸ that such is the case, although it is vigorously denied.³⁹

Taking into consideration the history of new inventions and new military weapons, one must find that conservatism among the military is an age-old custom and the remedy is for Congress to enact legislation which will permit this new arm of defense to obtain its place in national defense.

FREE SPEECH

That officers are embarrassed in testifying before congressional committees for fear of disciplinary measures, unfavorable consideration, or loss of opportunity for advancement, or other unfavorable action, was the subject of affirmative testimony⁴⁰ which was not refuted by other evidence. One is inclined to believe that there does

³³ General Drum, 1777; also 1914, 1622.

³⁴ Admiral Moffett, 358; Secretary Davis, 376; Colonel Mitchell, 1914.

³⁵ General Mitchell, 1690, 1895; General Patrick, 521.

³⁶ General Patrick, 521.

^{36a} Secretary Weeks, 624; General Drum, 1728, 1799; Colonel Mitchell, 1895; General Patrick, 521.

³⁷ Honorable Lea, 336.

³⁸ Major Walsh, 1710; Admiral Fullam, 2940; Senator Bingham, 2749, 2753; Edward Rickenbacker, 2158-2161; Honorable LaGuardia, 2377; Colonel Mitchell, 300, 2038, 1690, 296, 292, 1889, 1890, 2775, 2757, 2758, 1895, 1893, 1891; Honorable Lea, 336, 1710; Admiral Sims, 2973, 2975; Major Spatz, 2246.

³⁹ Secretary Weeks, 3018; Admiral Moffett, 361; General Drum, 1795.

⁴⁰ Admiral Sims, 3007; Honorable LaGuardia, 1667; Colonel Mitchell, 1675.

exist at least a feeling of embarrassment, particularly among junior officers, in giving testimony, and this condition should not be permitted to continue.

UNITY OF COMMAND

"Unity of command" is one of the major points of the whole air controversy and about which there is a decided difference of opinion as to just what it is. It must be admitted that "unity of command is a prime requisite."⁴¹

The adherents of the unified air service want unity of command for the air services in peace and of all other services in time of emergency,⁴² while the Army wants unity of command for the Army, including its Air Service, and the Navy wants unity of command for its fleet, stations, Marine Corps, and its Bureau of Aeronautics.⁴³

The opponents of the unified air service are horrified at the idea of a "trinity of command" which the "proposed organization creates,"⁴⁴ and it is argued that "another uncoordinated⁴⁵ national defense force in the field of battle" would be a catastrophe, yet the cooperation between the Army and Navy is claimed to "be very good."⁴⁶

Other testimony is offered to the effect that "there is no unity of counsel among them; there is no unity of thought. Each is working on a separate basis without any thought for the thing as a whole,"⁴⁷ and the prophesy is made that "there will never be complete understanding" between the unified air service and the Navy⁴⁸ were the unified air service proposal enacted into law.

The arguments of the unified air service for unified command, according to the "paramount interest," are supported by the anticipation of the Joint Army and Navy Board that there would be interchange in the employment of Army, Navy, and marine aircraft in their use under one command, whether Army or Navy. (Policy of Joint Board, pp. 1651-1652.)

One is forced to believe that unified national defense effort is obtained only by the unified air service proposal, with the Army, Navy, and air under one secretary of defense.

DUPLICATION OF AIR EFFORT

Duplication of effort and money is charged in experimentation, supply, and administration, and it is, of course, obvious that the Army, Navy, and Post Office now maintain separate purchasing, engineering, and production organizations⁴⁹ while other departments of the Government maintain machinery and facilities for doing much work now done by these services at scattered points.

There is, also, testimony tending to minimize this duplication as a result of the efforts of the Aeronautical Board,⁵⁰ though it is ad-

⁴¹ Drum, 1880; Weeks, 1842, 1762; Dickman Board, 1723; Lieutenant Commander Edwards, 1326, 1325.

⁴² Milling, 2274; Captain Johnson, U. S. Navy, 1955; Sir Samuel Hoare, 1929; Edw. Rickenbacker, 2159.

⁴³ Lieutenant Commander Edwards, 1326.

⁴⁴ Secretary Weeks, 3059, 1842.

⁴⁵ Drum, 1880.

⁴⁶ Secretary Wilbur, 364.

⁴⁷ C. M. Keys, 1399.

⁴⁸ Admiral Moffett, 382.

⁴⁹ Patrick, 529; Paul Henderson, 287; Mitchell, 1688, 1988, 1890, 1695; Emmons, 43; Moffett, 400; Weeks, 639.

⁵⁰ National Advisory Committee for Aeronautics, 1639, 1640; Theodore Roosevelt, 2349; Lieutenant Commander Du Bose, 1611-1612.

mitted "there is a certain amount of duplication in spite of everything we can do."⁴⁹

There is also the suggestion that under a unified air service there would be a "general duplication all along the line."⁵¹

Coast defense is heavily bombarded in the testimony. Duplication of stations is brought out, with Hawaii and Panama cited as examples. In Panama there are two adjoining flying fields belonging respectively to the Army and Navy on which millions have been spent. This condition should not be permitted to continue.

COAST DEFENSE

Duplication of effort and conflict of authority in coast defense is given rather great prominence in the hearings.

Testimony points to both the Army and Navy planes now scouting over the coastal waters⁵², and the difficulty of coordinating the Army and Navy as at present organized along the coast⁵³. This criticism applies, it would appear, not only to the two present military air services but to the Army and Navy proper.

Reference is made by a witness to the law of 1920 which assigns certain functions to the Army and Navy air services and he objects to the interpretation put upon it by the joint board in its policy of 1923.⁵⁵

One must indorse the suggestion of Secretary Davis⁵⁶ that the question as to who shall have control of the coast defense "ought to be decided. That is a very important point. That is one very constructive thing this committee, or some other committee, might do."

Considerable evidence was introduced to the effect that control should be given to the Army.⁵⁷ A naval witness recognizes that "neither efficiency nor economy is promoted through a divided administration of a single area" but wants the Navy to control this "twilight zone."⁵⁸

There is also the proposal that the unified Air Service should be given coast defense as a "problem which, it appears, only a united air force can satisfactorily solve,"⁵⁹ or the air corps. Other testimony minimizes the usefulness of seacoast forts.⁶⁰

The Army's functions inherently include all operations from shore bases and the Navy's function is inherently operation from mobile bases at sea.

EFFECT OF AIRCRAFT ON COAST DEFENSE

That "aircraft possess important strategical and tactical qualities in operations of coast defense and in adequate quantities may be

⁴⁹ Patrick, 529; Paul Henderson, 287; Mitchell, 1638, 1938, 1890, 1695; Emmons, 43; Moffett, 400; Weeks, 639.

⁵¹ Commander Whiting, 1473, 1470; Lieutenant Commander Du Bose, 1611-1612; Secretary of War, 1842.

⁵² Patrick, 529, 530; Milling, 2265, 2263, 2267; Lieutenant Commander Du Bose, 1612; Lieutenant Commander Mitscher, 1485; Major Walsh, 1708; Admiral Moffett, 1646.

⁵³ General Drum, 1768.

⁵⁴ Major Milling, 2268; Colonel Mitchell, 1631, 1898.

⁵⁵ Commander Whiting, 1472; joint board, 1651.

⁵⁶ Secretary Davis, 663.

⁵⁷ Major Milling, 2265, 2263, 2267, 2268; Colonel Mitchell, 1631, 1898; Secretary Weeks, 646, 3062; Major Walsh, 1711, 1706, 1705, 1707.

⁵⁸ Captain Craven, U. S. Navy, 17, 18, 19; Commander Mitscher, 1487; Commander Edwards, 1299.

⁵⁹ General Patrick, 1896, 524; Colonel Mitchell, 1912.

⁶⁰ Admiral Fullam, 3099; Colonel Mitchell, 1696, 2758; Hon. LaGuardia, 2376.

the decisive factor in such operations" ⁶¹ is borne out by a wealth of testimony. ⁶²

One is satisfied from the evidence of the aircraft's supremacy over the ship at sea, but renewed experiments and demonstrations both for practice and for further development should be had.

PROCUREMENT AND PRODUCTION

Production is deemed of such importance as a result of the last war experience that the "Army Industrial College" has been established. ⁶³

The unified air service, of course, contemplates centralized production and the weight of testimony ⁶⁴ appears to be on the side of the unified air service in this particular, even though witnesses do not agree with the other elements of the unified air service proposal. ⁶⁵

The evidence for centralized production is not overwhelming, however, for naval witnesses solidly insist on separate sources of supply ⁶⁶ and it is pointed out that the department with the greatest power would get equipment first, that for material wanted would be substituted something else, etc.

A central production organization is essential, both for efficiency and economy.

FLYING AS A DISTINCT ARM

It would seem apparent that the principal duty of flying personnel is to fly and to keep in flying trim and proficient with the ever-changing progress in acrobatics, formation flying, navigation, cross-country work, direction radio, radio telegraphy and telephony, observation, reconnaissance, mapping, bombing, night flying, aerial gunnery, uses of gases and smoke artillery adjustment, Infantry liaison, attack aviation, photography and interpretation, etc., in addition to routing exercises, maneuvers, etc.

The consensus of opinion ⁶⁷ is that military aeronautics is of sufficient importance to demand undivided attention. In the Army Air Service, the airman's sole duty is flight and its attendant features. In the Navy, after a temporary detail to aeronautics, the airman returns to the line for sea duty, and in order to obtain promotion, a great point is made by the Navy that the airman must be in all respects a fully competent officer of the line—a "jack of all trades." ⁶⁸

⁶¹ General Drum, 1752, 1870.

⁶² Major Milling, 2267, 2268; Commander Whiting, 2140; General Pershing, Secretary Roosevelt, and Secretary Weeks, 1897; Admiral Sims, 2961, 2980, 2986, 2972, 2983, 2984; Colonel Mitchell, 335, 339, 1686, 1678, 1680, 1677, 1890.

⁶³ Secretary Davis, 691.

⁶⁴ General Drum, 1801, 1723, 1721, 1794; American Aviation Mission, 1226; Army board on Curry bill, 1725; General Pershing, 1729; Maj. D. C. Emmons, 41; ex-Secretary of War Baker, 1236; English Air Ministry, 1301; French system, 1461; Italian system, 1463; C. M. Keys, 1153; Aviation magazine subscribers' program, 329; Hon. LaGuardia, 1664, 1663.

⁶⁵ General Drum, 1801.

⁶⁶ Lieutenant Commander Edwards, 1326, 1327; Admiral Moffett, 1634, 388; Commander Whiting, 1469; Capt. E. G. Land, U. S. Navy, 1339, 1338, 1316; Captain Edwards, U. S. Navy, 1315.

⁶⁷ Colonel Mitchell, 2768; Admiral Moffett, 355; Lieutenant Montgomery, U. S. Navy, 2098; Commander Whiting, 2144, 1474; Lieutenant Holcombe, U. S. Navy, 2186, 2187, 2193; Lieut. R. A. Olstie, U. S. Navy, 2182, 2186; Admiral Shoemaker, 2237-2238.

⁶⁸ Lieut. J. K. Montgomery, U. S. Navy, 2098.

This general opinion as to flying as a "specialty,"⁶⁹ however, is modified by some witnesses who would return to the line of the Navy airmen whose flying days are over.⁷⁰

No evidence was presented by Army witnesses along this line as the policy in that branch speaks for itself.

Those who elect aeronautics should remain constantly in aeronautics if efficiency and economy is to be attained and there is no objection to arranging for the transfer of airmen, after such air service, to other branches of the military forces for which they may be fitted, or to civilian flying activities of the Government.

FLYING OFFICERS IN COMMAND

The hearings produced evidence that many naval officers are drawing flying pay though not qualified pilots or observers and it was pointed out that the law which established the Bureau of Aeronautics in the Navy provided that flying organizations, with the exception of aircraft carriers, or other vessels, shall be in all cases commanded by flying officers.⁷¹

Witnesses suggest that much of the unrest among naval flyers would be allayed if the law were strictly followed.

NAVAL AERONAUTICS AS A NAVAL PROBLEM

Naval witnesses consistently insist at considerable length that air personnel with the fleet must be "educated naval officers"; that naval aeronautics is an especially "intimate and integral part of Navy operations"; that "future careers of the personnel are wrapped up in the success of the Navy"; that naval aeronautics is of a "specialized naval nature" and a "distinct problem"; flyers must think of "naval success as a primary mission" and be "thoroughly indoctrinated with naval ideas."⁷²

They omit discussion of the definite proposal that under a unified air service the graduates of the air college who are to serve with the Navy go to the Navy for specialized training and future service. The very argument of these witnesses is included in the exact program of the unified air service.

The Army presents no special claims for such "intimacy." It makes no demand that its flyers shall serve alternately in the air, in the Infantry, or Cavalry, or Artillery, etc., throughout their lives. The committee omitted any great questioning of Army or other witnesses along this line, though enough testimony is brought out to show a contradiction.⁷³

That flying is the same, whether over land or over water, was testified to by both Army and Navy witnesses.⁷⁴ Other naval testimony modifies this. While agreeing that training and fighting is the same,⁷⁵ it is argued that upon completion of training naval

⁶⁹ Admiral Shoemaker, 2238.

⁷⁰ Admiral Moffett, 355, 382; Admiral Shoemaker, 2237, 2238.

⁷¹ Lieutenant Holcombe, U. S. Navy, 2219, 2183; Admiral Shoemaker, 2237, 2238; Aviation's national policy, 329; Lieutenant Montgomery, U. S. Navy, 2101; Colonel Mitchell, 1693-1694.

⁷² Captain Land, U. S. Navy, 1329; Lieutenant Commander Edwards, 1319, 1320, 1326; Admiral Moffett, 381, 382, 361, 386; Captain Johnson, U. S. Navy, 1999; Admiral Sims, 2974, 2965, 2967; Secretary Wilbur, 363, 364; Theodore Roosevelt, 2346; Secretary Baker, 1235.

⁷³ Secretary Davis, 683.

⁷⁴ General Patrick, 532; Edw. Rickenbacker, 2167-2168; Lieutenant Arnold, 714; Lieut. Leigh Wade, 707-708, 703-704, 706; Lieutenant Commander Edwards, 1322; Captain Land, U. S. Navy, 1329.

⁷⁵ Admiral Moffett, 1587; Commander Whiting, 1464.

flying has "no common ground with the other forms of air training."⁷⁶ The point is also made of the special naval training necessary for take-off and alighting on aircraft carriers' decks, etc.⁷⁷ It is within the recollection of all that such maneuvers were first demonstrated by airmen trained on land before our naval air service existed.

Evidence is also given on the special training required for adjustment of naval gunfire,⁷⁸ radio,⁷⁹ smoke screens,⁸⁰ observation,⁸¹ and bombardment.⁸²

It would seem from the evidence, or its lack, that artillery adjustment, bombing, screening, radio, and other functions of air operations, whether over water or land, are identical or practically the same. Where special knowledge, such as recognition of types of vessels, and other, is necessary, proficiency therein would naturally be acquired through training with the Navy and with the Army, as proposed in the unified air service plan, to which this evidence is offered in objection.

It is not believed that Navy aeronautics differs in principle from Army aeronautics. The general functions of military aircraft and their employment are in the main the same, whether over water or over land. Should coast defense be definitely charged to the Army, or to the unified air service, aviators will doubtless be employed over both elements and will use both types of airplanes or amphibians interchangeably.

TYPES AND MODELS OF PLANES

Naval testimony was introduced to show principal differences between Navy and other aircraft, pointing out that seaplanes and flying boats are likely to be wrecked if forced to alight on land, and land planes will be lost if forced to alight in the water, and that land airplanes must be especially designed and strengthened for use in the Navy over water when launched from catapults and arrested by special devices when alighting, while Army airplanes have ample fields in which to operate.⁸³

Other testimony mentions housing on board ship, the necessity for minimum size, corrosion, seaworthiness, limited number of types,⁸⁴ special instruments for navigation, knowledge of navigation, etc.

Other testimony was to the contrary.⁸⁵

It would seem the best airplane for similar purposes over land or sea does not differ in characteristics except in those minor modifications adapting its alighting gear, etc., to use on shipboard or airdrome as the case may be. The same aerodynamic principles apply and skillful operation of the airplane, no matter how modified, is meas-

⁷⁶ Admiral Moffett, 1587, 361, 386; Commander Whiting, 1464; Lieutenant Commander Edwards, 1319, 1326; Captain Land, U. S. Navy, 1329; Secretary Baker, 1235; Roosevelt, 2346; Lieutenant Holcombe, 2187-2188.

⁷⁷ Theodore Roosevelt, 2346.

⁷⁸ Admiral Moffett, 1584, 383; Lieutenant Commander Edwards, 1326; Captain Land, U. S. Navy, 1329; Lieutenant Holcombe, U. S. Navy, 2188.

⁷⁹ Admiral Moffett, 385.

⁸⁰ Admiral Moffett, 384.

⁸¹ Lieutenant Commander Edwards, 1324, 1325, 1318; Admiral Moffett, 384; Theodore Roosevelt, 2346.

⁸² Admiral Moffett, 384.

⁸³ Admiral Moffett, 385, 361; Brassey's Naval Annual, 1585; Commander Mitscher, 1488, 1486.

⁸⁴ Admiral Moffett, 361, 385, 386; Theodore Roosevelt, 2349; Commander Richardson, 1489, 1490; Commander Whiting, 1476; Secretary Wilbur, 371.

⁸⁵ Major Milling, 2258, 2259; Admiral Moffett, 409; Major Walsh, 1707.

ured by ability as a pilot rather than other special qualifications of either Navy or Army personnel.

It is to be noted that in the recent races the Army and Navy had identical planes which won both land and water contests, changing from land to water gear without difficulty, Navy pilots flying land planes and vice versa.

In actual service planes it is noted that the Army and Navy have different models for practically the same missions and it is not apparent to the committee that these differences, attended by increased cost in experimentation, design, and production, are sufficiently important to support the theory of extraordinary requirements for naval aircraft. It is noted that the British, French, and Italian Governments have unified production.

One is familiar with the fact that wheeled airplanes take off in about the same distance whether on land or aircraft carrier. Provision of arresting or launching gear and proficiency in its operation does not seem to require knowledge peculiar to naval officers.

It is recalled that the adjustable and reversible propeller has been designed and tried on land airplanes for the same purpose of arresting flight as well as for improving get-away with load and other advantages.

It is conceivable that in future it may be necessary in operations from land, either military or civil, to take-off and alight in confined spaces or mountainous country. The universal propeller, portable launching gear, and arresting systems may doubtless be as important on land as at sea.

It is considered, too, the Army makes use of water aircraft, and such must, it would appear, have similar qualities and characteristics as especially demanded for water aircraft of the Navy.

The development of the amphibian plane may indicate a possible reduction in types of planes.

A centralization of the aircraft procurement and production organizations of the Government could result in greatly increased efficiency and economy without detriment to the technical interests of any operating department.

AIRDROMES

Much of the advantage in all air transport, whether of passengers or goods, must be lost when airdromes are located at considerable distances in point of time of ground travel from the cities which they serve.

Where Government airways are in operation, the nearest available location should be selected. In the case of New York City, the Government owns Governors Island, which should be the New York terminal for the post-office air service and in the case of Chicago Grant Park should be the post-office terminal for Chicago.

Similar use should be made of other Government property, similarly located, as other Federal airways may be put into operation and Government airdromes and fields should be available to private aviation enterprises.

TECHNICAL DEVELOPMENT

Study and experimentation should be conducted toward the reduction in size of such airway terminals, actually and through the development of launching and arresting devices, adjustable and reversible propellers, design of aircraft, and the like.

There will be great objection to the noise now made by open exhausts, and efficient mufflers should be developed.

Illumination of fields, signaling systems, night flying beacons, directional radio, or other forms of guidance should be improved.

The service of the Weather Bureau to aerial navigation should be enlarged to meet requirements of military and civil flight as the lack of proper meteorological data for aeronautics has caused and will continue to cause many fatal crashes. The loss of personnel and equipment amounts to many times the cost of this service.

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